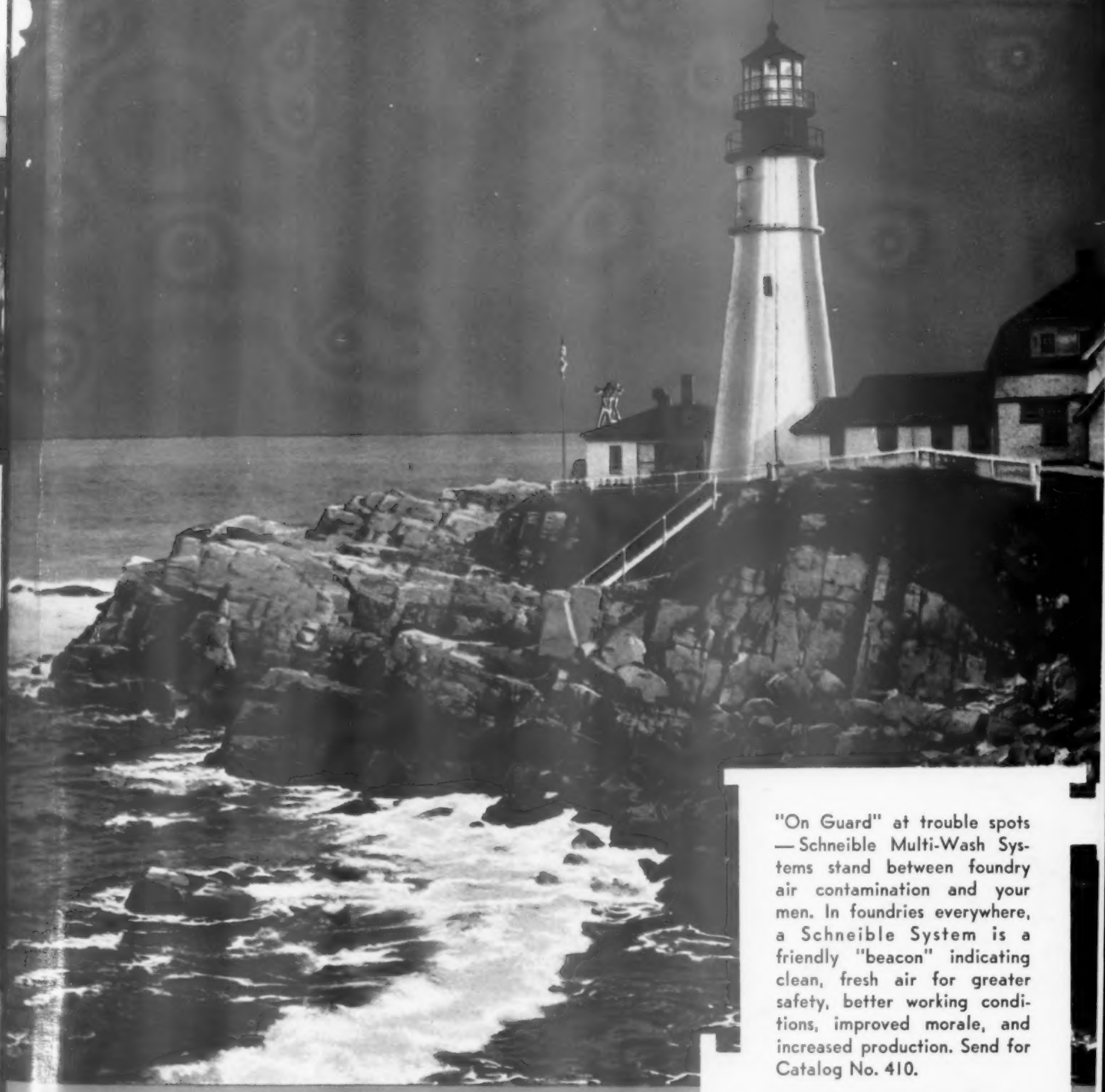
April 1948

THE FOUNDRY

wherever metals are cast...



"On Guard" at trouble spots — Schneible Multi-Wash Systems stand between foundry air contamination and your men. In foundries everywhere, a Schneible System is a friendly "beacon" indicating clean, fresh air for greater safety, better working conditions, improved morale, and increased production. Send for Catalog No. 410.

CLAUDE B. SCHNEIBLE CO.
2827 Twenty-Fifth St., Detroit 16, Mich.

SCHNEIBLE
Dust, fume and odor control equipment

Gathering sea shells to be used in an early American furnace. In the foreground is the first Colonial pot cast in America.

Despite Crude Tools and Materials

There Was Craft in Their Castings!

PURITE is commercially pure soda ash containing over 98% sodium carbonate, fused and cast into convenient 2-lb. pigs. Its desulfurizing and refining action are traceable to the chemistry of soda ash.

Eighteenth century producers of American cast iron were handicapped by the tools and materials then available. Bog iron from the floors of ponds, lime in the form of sea shells, crude furnaces, and cruder mechanical appliances—these were the limitations. But in spite of such difficulties, the early American iron founders produced castings that showed resourcefulness and craft.

Consider the advance in foundry practice since these early days. Of course, foundries now have better materials and improved equipment – the forehearth, for instance, in which the molten iron is refined after coming from the cupola.

Modern foundries also have PURITE—an alkali prepared in two-pound pigs. PURITE reduces sulfur, deoxidizes the iron, and washes out occluded gases and entrained slag particles. The result is a clean, fluid iron with improved casting properties.

Let us send you our latest pamphlet giving details on the advantages of using PURITE. The Mathieson Alkali Works (Inc.), 60 East 42nd Street, New York 17, N. Y.

Mathieson

PURITE

Purite (Fused Soda Ash) . . . Liquid Chlorine Caustic Soda . . . Soda Ash . . . Bicarbonate of Soda . . . Ammonia, Anhydrous & Aqua Sodium Chlorite Products . . . Chlorine Dioxide HTH Products . . . Dry Ice . . . Carbonic Gas Sodium Methylate

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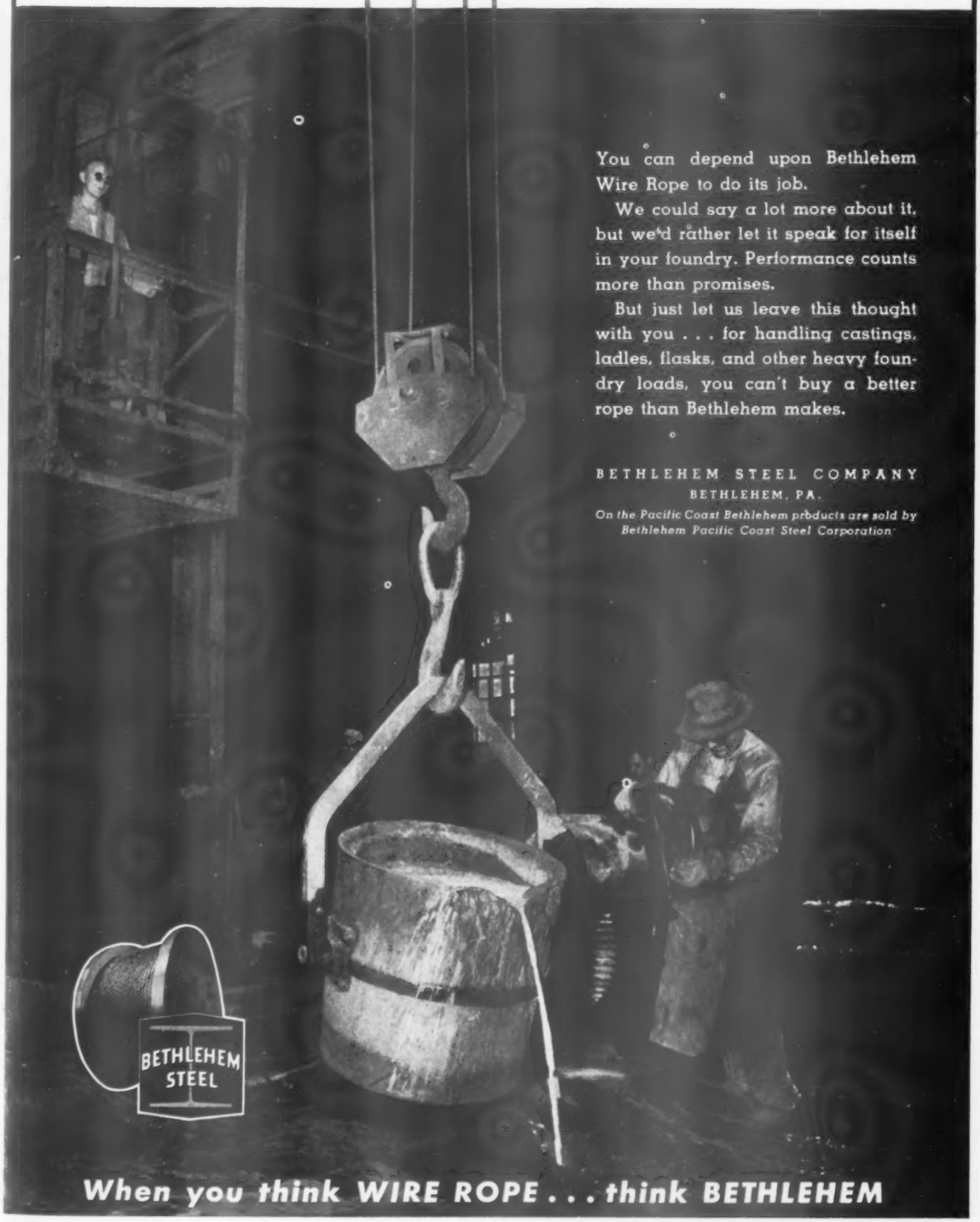
DETROIT

WHERE IT SPEAKS FOR ITSELF



You can depend upon Bethlehem Wire Rope to do its job.

We could say a lot more about it, but we'd rather let it speak for itself in your foundry. Performance counts more than promises.

But just let us leave this thought with you . . . for handling castings, ladles, flasks, and other heavy foundry loads, you can't buy a better rope than Bethlehem makes.

BETHLEHEM STEEL COMPANY
BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation

BETHLEHEM STEEL

When you think WIRE ROPE . . . think BETHLEHEM

CONTROLLED STRENGTH

FEDERAL GREEN BOND imparts strength to foundry sand—but the degree of this strength can be limited by the degree of the mix. Do you want a firm, stable sand? Do you want a sand that collapses readily and flows freely? Or do you want a sand strength in between? GREEN BOND *controls* sand strength. Foundrymen everywhere hail its uniformity. Best of the Bentonites, FEDERAL GREEN BOND never varies in quality or performance. Its strength lies in its popularity, and its popularity lies in its strength.

SEE US AT THE FOUNDRY SHOW BOOTH 802

F E D E R A L

GREEN BOND

The Best of the Bentonites

THE FEDERAL FOUNDRY SUPPLY COMPANY

4600 East 71st Street • Cleveland 5, Ohio

Seacoal Plant — Mines

CROWN HILL, W. VA. • CHICAGO • CHATTANOOGA, TENN. • DETROIT • MILWAUKEE • NEW YORK • ST. LOUIS • RICHMOND, VA. • UPTON, WY

The Foundry Supply Co., Inc., 404 So. Third St., Minneapolis 15, Minn. • Beaumont Cement Sales Co., Houston and Beaumont, Texas, and Harvey, La. • Chamberlain Company Los Angeles, Calif. • Pacific Graphite Works, Oakland, Calif. • LaGrand Industrial Supply Co., Portland, Ore.

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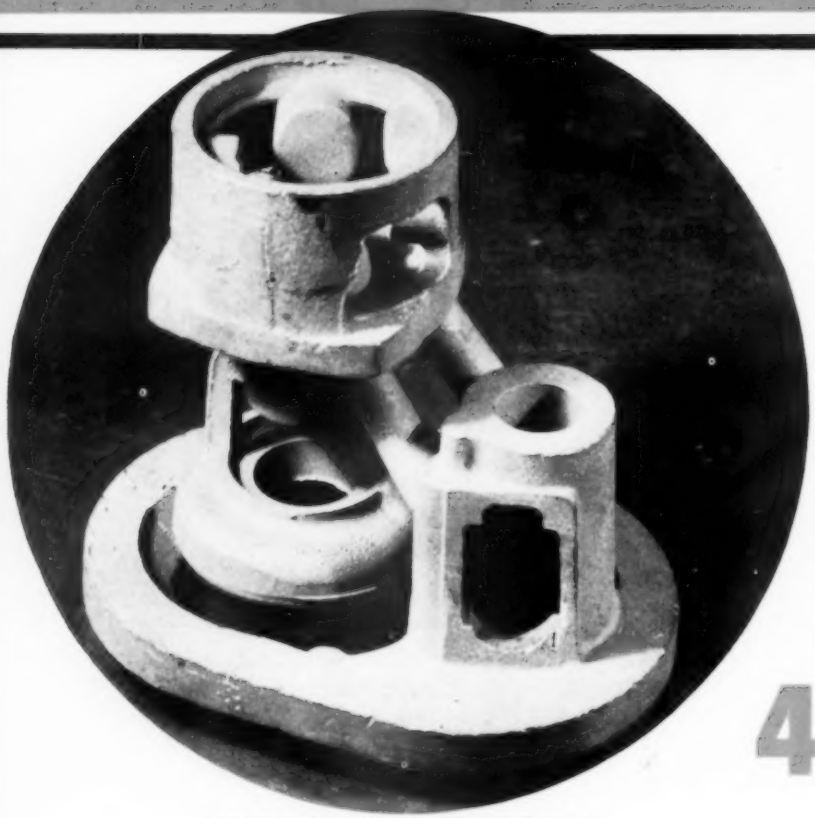
APRIL 1948

VOLUME 76 — *NUMBER 4*

	Page
Editorial	67
Solidification Mechanism of Tin Bronzes By CLYDE L. FREAR	68
Doubles Foundry Capacity With Same Floor Area By WILLIAM G. GUDE	72
Desulphurizing With Soda Ash By W. W. LEVI	78
Steel Founders' Society Holds Annual Meeting By FRANK G. STEINEBACH	80
Aluminum Alloy Castings (Part V) By FLOYD A. LEWIS	82
ASTM and the Foundry Industry By CARTER S. COLE	86
Molding Sheaves In Dry Sand Cores By WILLIAM PINK	88
The Gray Iron Castings Industry (Part II) By RAYMOND L. COLLIER	90
Produces Wide Variety of Iron and Nonferrous Castings By GERALD E. STEDMAN	92
Foundry Sand—Uncontrolled By HAROLD E. HENDERSON	95
Extensive Technical Program Scheduled for AFA Congress	100
Birmingham Conference Report By WILLIAM G. GUDE	113
Around Detroit By ARTHUR H. ALLEN	122
Man-to-Man on the Molder's Bench By RALPH L. LEE	128
The Adventures of Bill By PAT DWYER	198
Valve Manufacturer Expands Foundry By JOSEPH C. SULLIVAN	208
Wisconsin Conference Report By EDWIN BREMER, PAT DWYER and ERLE F. ROSS	214

Questions and Answers	96	Industry Briefs	226
Men of Industry	102	Equipment and Supplies	238
Obituary	126	Trade Publications	258
Foundry Developments	132	Manufacturers' Literature	275
Foundry Data Sheet	135	Where-to-Buy Directory	286
Foundry Groups Activities	152	Advertisers' Index	305

BRING YOUR PROBLEMS TO



AIRCRAFT ENGINE BOOSTER PUMP
CAST IN ALL DRY SAND MOLD.

The Advance Aluminum Castings Corp.

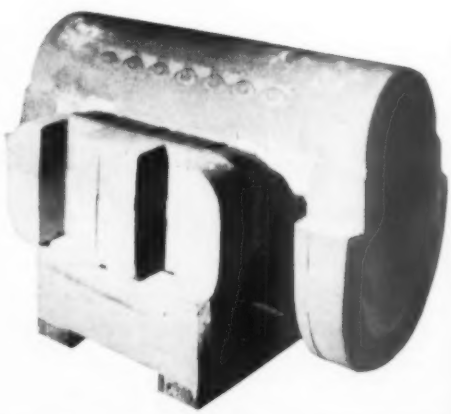
Chicago • Illinois

LINOIL BOOTH 412 • 511

New ideas in operation . . . the latest equipment . . . advanced techniques . . . assembled under one roof for the 1948 AFA Convention . . . offer the ideal opportunity to better your own foundry practice. Somewhere among the equipment displays, the lectures, the research papers, and the shop talk of practical foundrymen you are sure to find the solution to your foundry's problems.

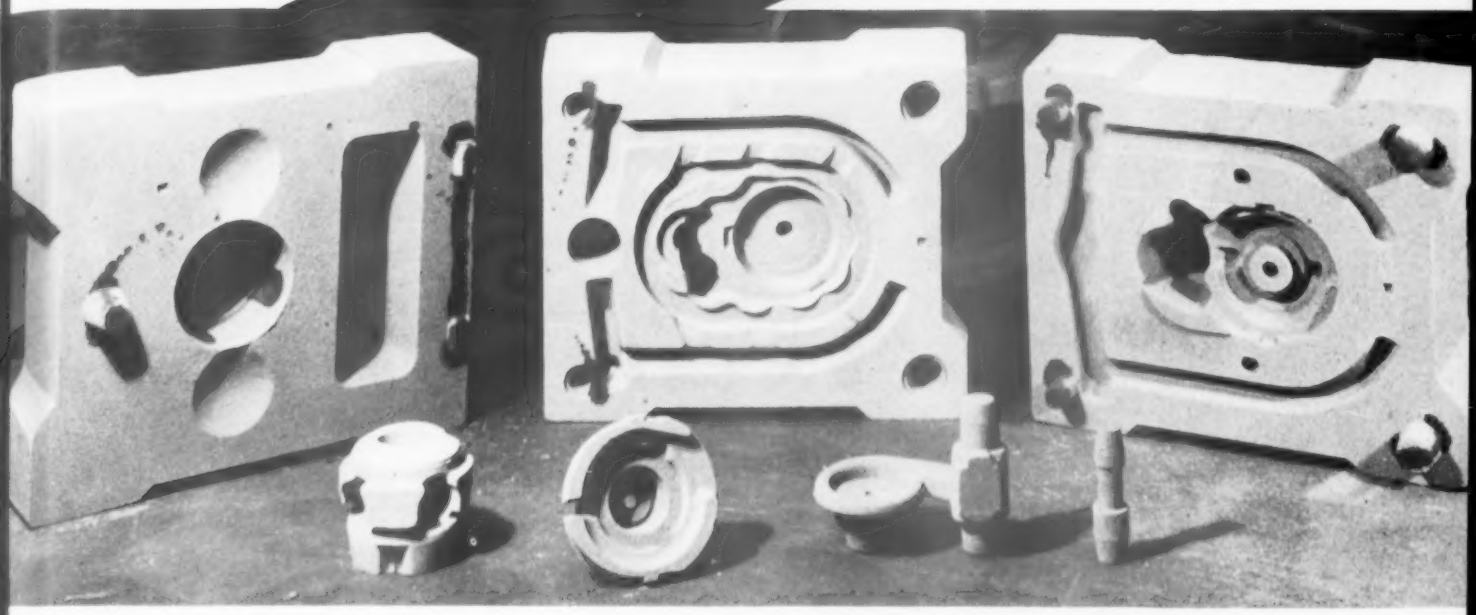
BRING YOUR CORE PROBLEMS TO THE LINOIL BOOTH

Bring along that troublesome core, if you like. Whatever your core problem . . . put it before "core engineers" whose practical experience in thousands of foundries of all types has helped solve every kind of core problem. Here, in the LINOIL Booth, 32 practical "core engineers" . . . men who thoroughly understand steel, malleable, gray iron, and non-ferrous core work . . . are available to help banish your core troubles.



BLOWER HOUSING CORE. LINOIL "38" INSURES QUICK COLLAPSIBILITY.

THE CONVENTION MAY 3-7



CORE MOLD—FOR BOOSTER PUMP—HELPS PRODUCE CLEANER CASTINGS OF CLOSER TOLERANCES

Why not bring along the men who live with your problems—your core boss or superintendent? Let them get first hand answers to their troubles . . . answers which will pay off in smooth running production during the months ahead.

Good cores help The Advance Aluminum Castings Corp., produce some of the most complicated castings made by the aluminum industry. Extensive use of core molds aid in pouring castings of closer tolerances, more rigid specifications. For unhindered collapsibility, aluminum's low thermal capacities require strong cores at exceptionally lean ratios (1:160). LINOIL "38"—especially designed for aluminum—keeps their core scrap down to 1%—as core production runs smoothly . . . dependably . . . at lowest cost.

THE LINOIL — THE LOGICAL OIL

WERNER G. SMITH COMPANY

(DIVISION OF ARCHER-DANIELS-MIDLAND COMPANY)

2191 WEST 110th STREET · CLEVELAND 2, OHIO

New!

Pangborn ROTOBLAST "TABLE-ROOM" FOR ALL GENERAL-PURPOSE BLAST CLEANING

WITH this new ROTOBLAST* the jobbing foundry can clean castings as *thoroughly* and almost as *economically* as the specialty foundries.

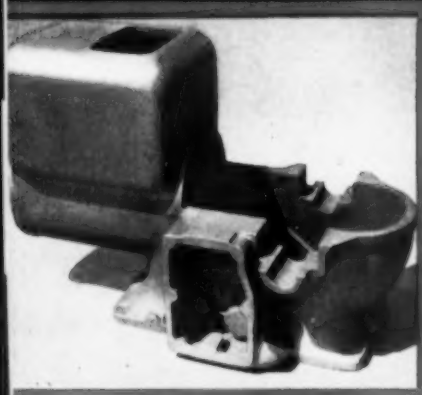
The jobbing foundry making a quantity of castings from different patterns has always been handicapped in the selection of a good single blast machine for all types of general-purpose blast cleaning work.

The Pangborn "Table-Room" will quickly clean castings weighing a few pounds and in any shape, to a casting weighing 5,000 pounds and up to five feet in length and thirty inches high.

The ROTOBLAST "Table-Room" is easy to operate. Put castings on table, close the doors, turn on the blast and within a few minutes the castings are cleaned down to virgin metal.

*Trademark of the Pangborn Corporation

CLEANING CASTINGS LIKE THESE IS A ROUTINE JOB FOR PANGBORN "TABLE-ROOM"



Some of the "TABLE-ROOM" advantages are:

No pit requirement for installation • Experienced operator not needed.
No compressed air, no helmets, no hose nor nozzles • 100% SAFE!

For complete information on this or any other Pangborn equipment to do your blast cleaning operations *faster, better, cheaper,* write to: PANGBORN CORPORATION, 1400 Pangborn Blvd., Hagerstown, Md.

More Than 25,000 Pangborn Machines Serving Industry

Pangborn

BLAST CLEANS CHEAPER with the right equipment for every job

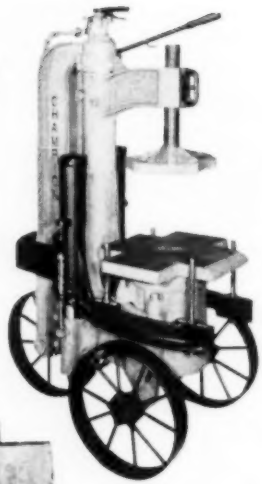
pork and beans

WHISKEY AND SODA

CORES AND MOLDS

Champion Machines Production

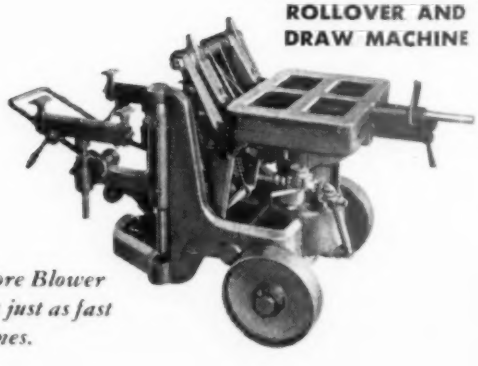
TYPE J-S
PORTABLE JOLT
SQUEEZE



To raise your standards of production, quality must be held at its peak. And the quality of a casting reflects the quality of the mold and cores that formed it. That's why Champion engineers pay particular attention to those features of Champion molding machines and core blowers which bear on the precision, density, uniformity, and surface character of the molds and cores. Equip your workers with Champion machines and enable them to produce molds and cores they will be proud of, that will assure highest quality castings.

TYPE J-SL
JOLT SQUEEZE PIN LIFT

TYPE J-M
POWER JOLT HAND
ROLLOVER AND
DRAW MACHINE



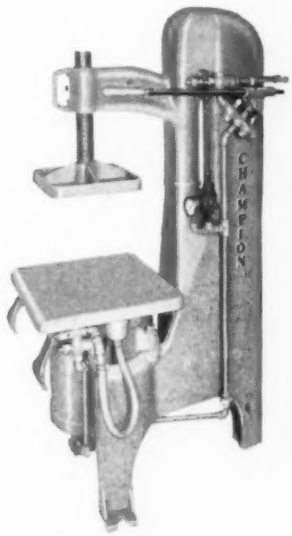
Champion 400 Core Blower turns out big cores just as fast as small ones.

and Efficiency!

THEY JUST NATURALLY "GO TOGETHER!"

Standard Champion Jolt Squeeze is accurate enough for precision stack molding.

Balance quality with speed, if you are after real production efficiency! Champion engineers know this too, and so Champion Machines are designed for speed as well as precision. Champion equipment improves the individual worker's production in quantity as well as quality; enables him to turn out more and better cores and molds with less effort. Reducing unit costs and keeping quality up, Champions are doing their part in winning the battle for production being waged on Industry's entire front.



TYPE J-S
STATIONARY JOLT SQUEEZE

TYPE W HAND RAM, ROLLOVER AND DRAW MACHINE

★

WATCH FOR ANNOUNCEMENT OF OUR NEW MODEL CORE BLOWER, THE "JUNIOR"

CHAMPION
FOUNDRY AND MACHINE CO.

1318 W. 21st STREET CHICAGO 8, ILLINOIS

MOLDING MACHINES · ELECTRIC RIDDLES · CORE BLOWERS

DELTA

NO-VEIN

COMPOUND

ADDED TO CORE AND FACING SAND MIXES

✓ *Eliminates Veining . . .*

✓ *Prevents Metal Penetration*

DELTA FOUNDRY PRODUCTS CUT PRODUCTION COSTS

PLASTIC-type Core & Mold Washes . . . For Steel, Malleable, Grey Iron and Non-Ferrous Metals. Highly refractory, Waterproof, Non-deteriorating.

NO-VEIN Compound . . . Prevents veining and metal penetration.

CHILLKOAT . . . Eliminates use of metal chills on Grey Iron Casting.

SPRAY BINDERS . . . Produce dry sand mold properties.

PERMI-BOND . . . The economical, highly efficient Seacoal Replacement.

PARTEX . . . The original, and ONLY, Nut Shell Parting.

BONDITE . . . The NEW Waterproof 100% Dry Binder.

MUDDING COMPOUND . . . A highly refractory material for patching joints.

CORE ROD DIP OILS . . . Make stronger cores. Cause sand to adhere to core rods and wires, after baking.

SAND CONDITIONING OILS . . . Stop all sticking of sand in core boxes.

PYRO-KOAT . . . A new powder wash—when applied as directed on green sand molds produces dry sand mold results.

LIQUID PARTING • CORE OILS AND BINDERS.

Add only a small quantity of DELTA NO-VEIN COMPOUND (1% to 3% maximum) to your core sand and eliminate troublesome veining of cores.

DELTA NO-VEIN COMPOUND is a specially prepared and compounded series of oxides which develop the necessary hot strength without, in any way, deteriorating the sand.

DELTA NO-VEIN COMPOUND retards sand grain expansion, practically eliminating the possibility of metal penetration.

Write for a liberal working sample. You will also receive complete instructions for use.

DELTA OIL PRODUCTS CO.

MILWAUKEE 9, WISCONSIN

Take These Speedy
SKIL Grinders

SKIL Sander with cup wheel grinding attachment

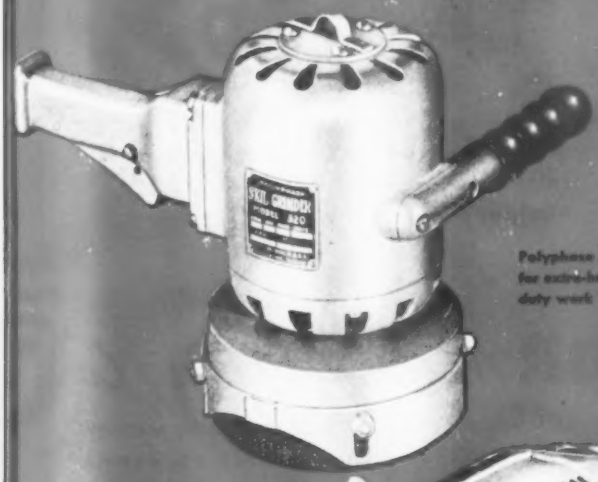
right to the job for finer, faster finishing

Electric SKIL Grinders are lightweight, easy to carry anywhere . . . balanced right, easy to use everywhere . . . and they pack the punch that assures top grinding speed on thousands of jobs. And for long-run economy you can't beat their high-quality motors, bearings, gears, shafts, housings . . . everything that adds up to lower operating cost per year. See your SKIL Tool Distributor today for a demonstration!

SKILSAW, INC. - 5033 Elston Ave., Chicago 30, Ill.

Factory Branches in Principal Cities

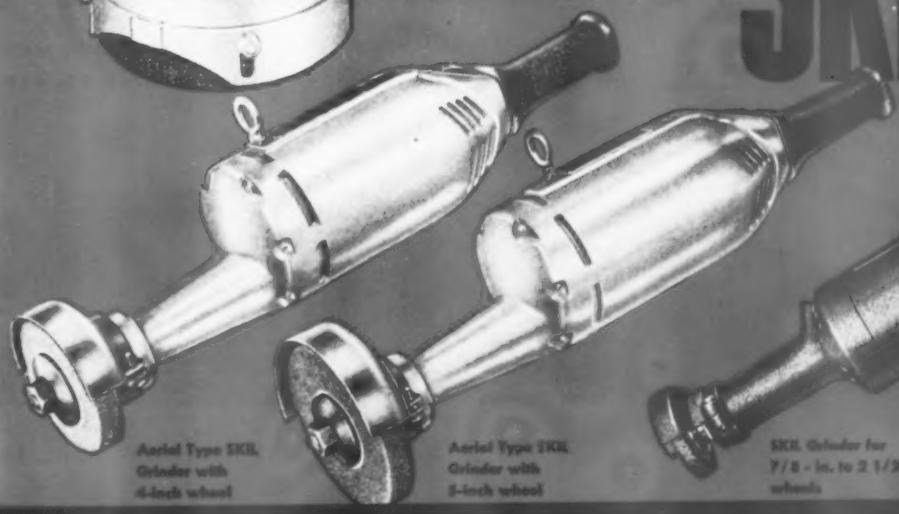
In Canada: SKILTOOLS, LTD., 66 Portland St., Toronto, Ont.



Polyphase SKIL Grinder for extra-heavy duty work

ELECTRIC **SKIL Tools** PNEUMATIC

TRADE-MARK



Axial Type SKIL Grinder with 4-inch wheel

Axial Type SKIL Grinder with 5-inch wheel

SKIL Grinder for 7/8 - in. to 2 1/2 - in. wheels

SKIL Grinder for 1/8 - in. to 7/8 in. wheels

There's little you CAN'T do...

with this Tabor cope and drag pair

TRUE—they can't help the coke shortage—or collect a slow account—but here's what they *can* do:

IN THE PRODUCTION SHOP

The Jar, Power Rollover, Power Draw machine will complete its cycle of operations in 35 seconds or less. And that's counting the time to deliver the mold to a hydraulic device which cushions it down to desired conveyor level.

With working access from three sides, the Jar, Flask Lift machine is an equally speedy mate. Together, they keep cope and drag production in near-perfect balance.

IN THE JOBBING SHOP

Both machines put high-production features into short-run work. The new plate design on the Rollover machine is a Tabor innovation. It permits *independent* setting of all four clamps—speeds changeover where pattern shifts are frequent.

Adjustable lift pins make the Jar Flask Lift equally versatile. They're quickly set for a wide range of flask lengths and widths.

Both machines are furnished either plain or shockless jar—stationary or portable (up to 1000# capacity). Both have the faultless Tabor air-on-oil draw. And, traditional with Tabor, both give long life at low up-keep.

You can do this, too!

You can modernize your present Tabor Jar, Power Rollover, Power Draw machine—step up both its speed and flexibility. Install in it the new quick-changeover table for *independent* setting of all four clamps and the hydraulic flask-lowering device for quick clearance of finished work. Easily done when your machine capacity is within the range of 600 to 3000 pounds.

REPRESENTATIVES

Snyder Foundry Supply Company, Los Angeles, California; Carl F. Miller & Company, Seattle, Washington; M. W. Warren Coke Company, 1017 Olive St., St. Louis 1, Mo.; E. R. Frost Company, Inc., Minneapolis 14, Minn.

The TABOR *Manufacturing Co.*

SINCE **1884** *MANUFACTURERS OF FOUNDRY MOLDING MACHINES*

6225 TACONY STREET • PHILADELPHIA 35, PENNA.

save labor...

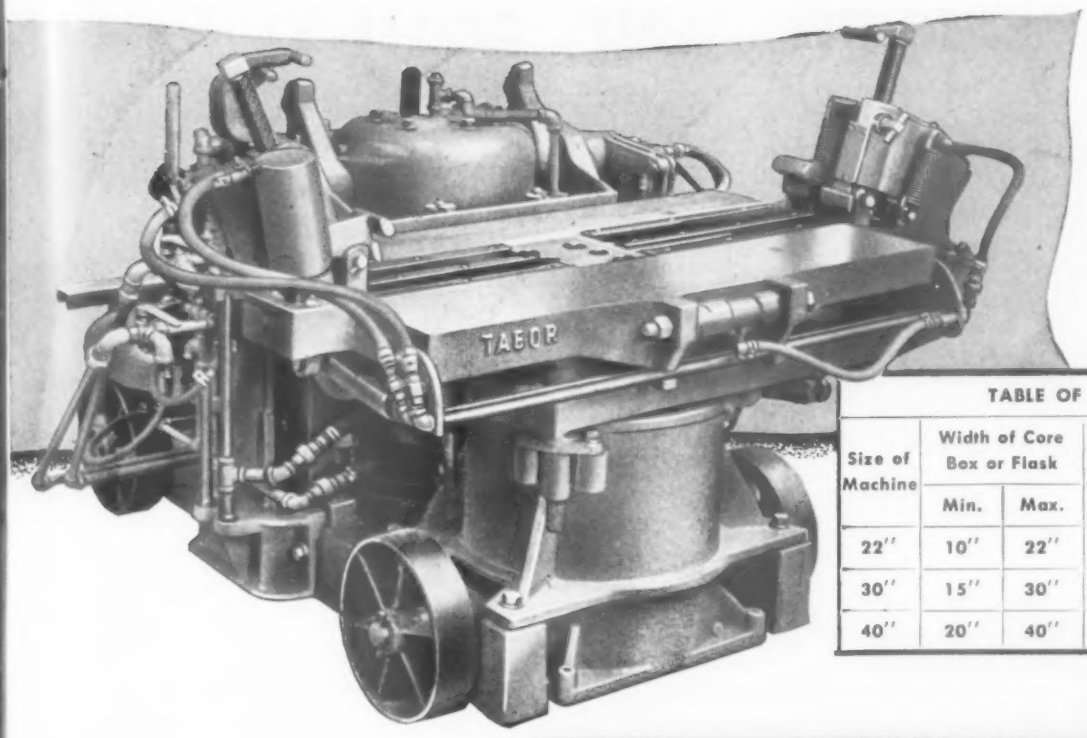
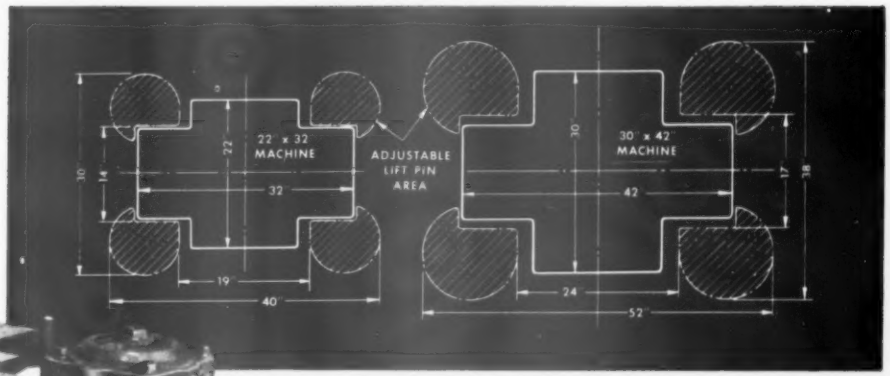
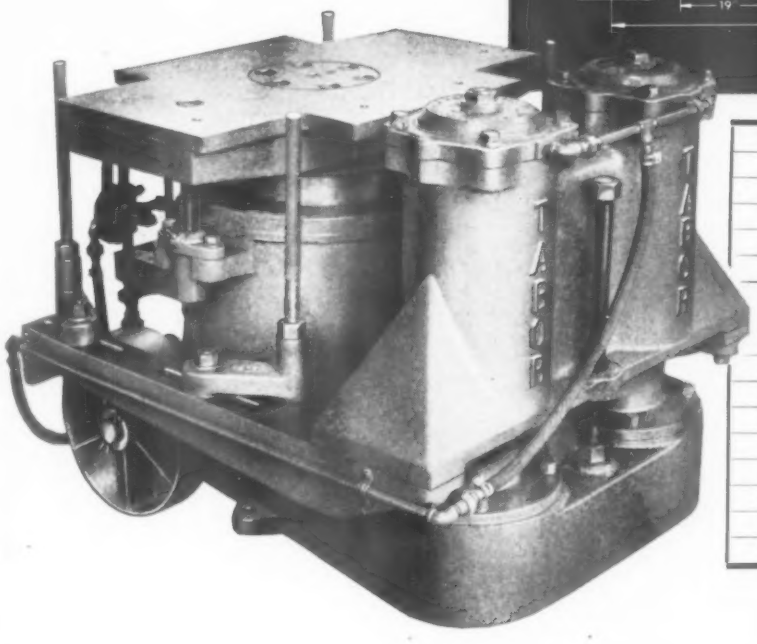


TABLE OF STANDARD SIZES						
Size of Machine	Width of Core Box or Flask		Length of Core Box or Flask		Height—including core plate	
	Min.	Max.	Min.	Max.	Min.	Max.
22"	10"	22"	20"	40"	7½"	14"
30"	15"	30"	26"	46"	8"	18"
40"	20"	40"	28"	56"	12"	25"



*Also available with squeeze head.



Size of Machine	22" x 32"*	30" x 42"
Table Size	22" x 32"	30" x 42"
Capacity—80# Air	600#	1000#
Patt. Draw.—Plain Jar	10"	12"
Patt. Draw.—Shockless	9"	12"
Lift Pin Adjustment	See cut	See cut
Max. Width Flask with Center of Flask on Center of Jar Mach.	30"	38"
Min. Width Flask	14"	17"
Max. Length of Flask	Unlimited within capacity of machine	
Patt. Draw.	Oil Controlled—Slow & Fast	
Height Table from Floor—Portable	28"	32"
" " " " —Stationary	26"	30½"
Portable Mach. 3 Wheels	12" Dia. 3" Face 14" Dia. 4" Face	
Stationary Mach.	3 Foundation Bolts	
Weight Shockless Jar	2600#	4000#
Weight Plain Jar	1900#	2700#

. . . . buy *Tabor*

MANUFACTURER'S ASSOCIATION, INC. FOUNDRY EQUIPMENT

PATTERN JOBBERS AND FOUNDRYMEN

Rent Pressure Casting Equipment

ON LOW MONTHLY RENTAL RATES. WE CAN FURNISH FOR INSTALLATION IN YOUR PLANT, A COMPLETE UNIT OF PRESSURE CASTING EQUIPMENT. THIS EQUIPMENT IS DESIGNED FOR CONCRETE OR UPPER WOOD FLOOR INSTALLATIONS, REQUIRING LESS THAN 18 x 20 FEET OF FLOOR SPACE.

MAKE YOUR OWN PRESSURE CAST ALUMINUM MATCHPLATES, COPE & DRAG PLATES, CORE BOXES, LOOSE PATTERNS, FLAT PLATES, DRIER PATTERNS and other precision and experimental PRESSURE CASTINGS IN PLASTER MOLDS.

SAVE THE TWO-WAY WASTE IN TRANSPORTATION TIME, TO AND FROM MATCHPLATE VENDORS, AND GIVE YOUR CUSTOMERS FAST, EFFICIENT TWO DAYS TO ONE WEEK SERVICE, THAT HE WANTS.

CAPACITY OF OUR RENTAL UNIT IS (50) MATCHPLATES PER MONTH, OR, THE EQUIVALENT IN CORE BOXES OR OTHER PRESSURE CASTINGS, UP TO 18" x 24" FLASK SIZE.

LOW COST OF RENTAL WILL MAKE THE UNIT PROFITABLE TO YOU, IF YOU MAKE OR USE AS FEW AS (6) MATCHPLATES OR THE EQUIVALENT IN CORE BOXES OR OTHER TYPES OF ALUMINUM PATTERN EQUIPMENT PER MONTH.

PRESSURE CASTING TECHNIQUE WILL BE FURNISHED COMPLETE TO ALL OUR LESSEES OF RENTAL UNITS, INCLUDING PERSONAL INSTRUCTIONS IF DESIRED. APPRENTICES OR SAND MOLDERS CAN PRODUCE PRESSURE CASTINGS QUICKLY WITH OUR ASSISTANCE.

PROSPECTIVE LESSEES ARE INVITED TO VISIT OUR DETROIT PLANT TO SEE ONE OF OUR RENTAL UNITS SET UP.

ALL MATERIALS SOURCES WILL BE SUPPLIED BY US WITHOUT OBLIGATION.

WE GUARANTEE SATISFACTORY PERFORMANCE OF OUR RENTAL EQUIPMENT, OUR TRAINING SERVICE, COOPERATION, AND, A COMPLETE, PRACTICAL SET UP.

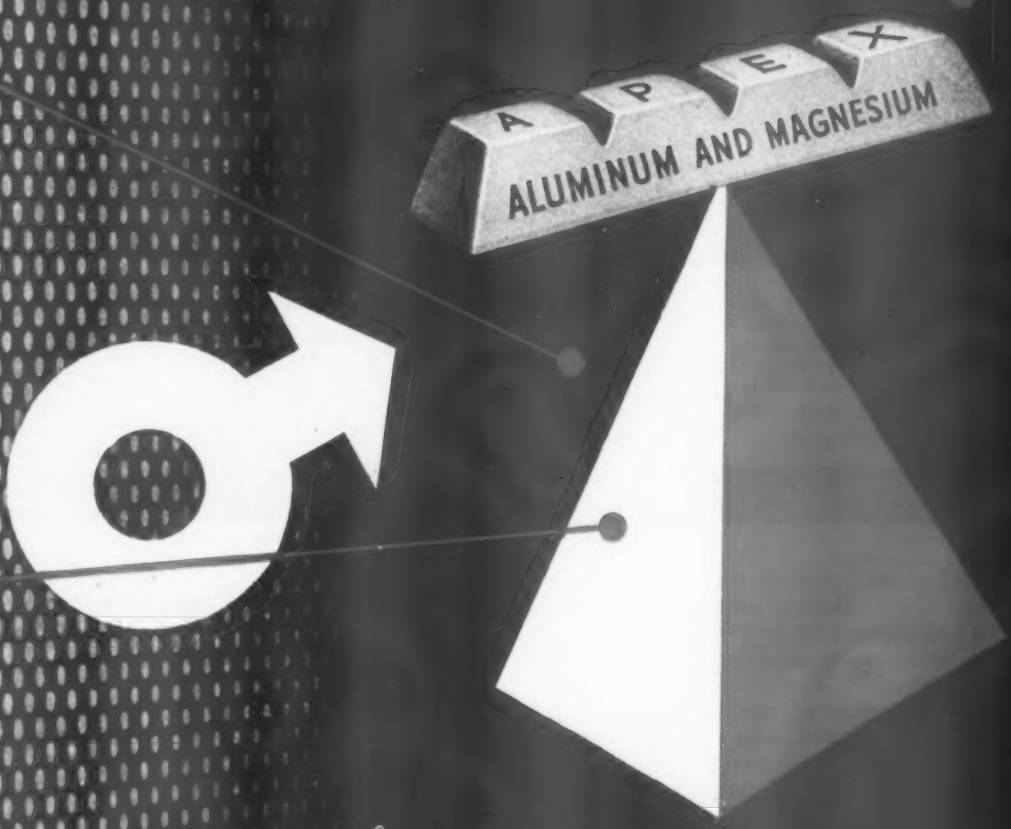
●

PRESSURE CAST PRODUCTS CORPORATION

1030 VERMONT AVENUE **DETROIT 16, MICHIGAN**

See our other advertisement, Page 155

Research Leadership back of every Ingot



Quality Ingot is your assurance of Quality Castings

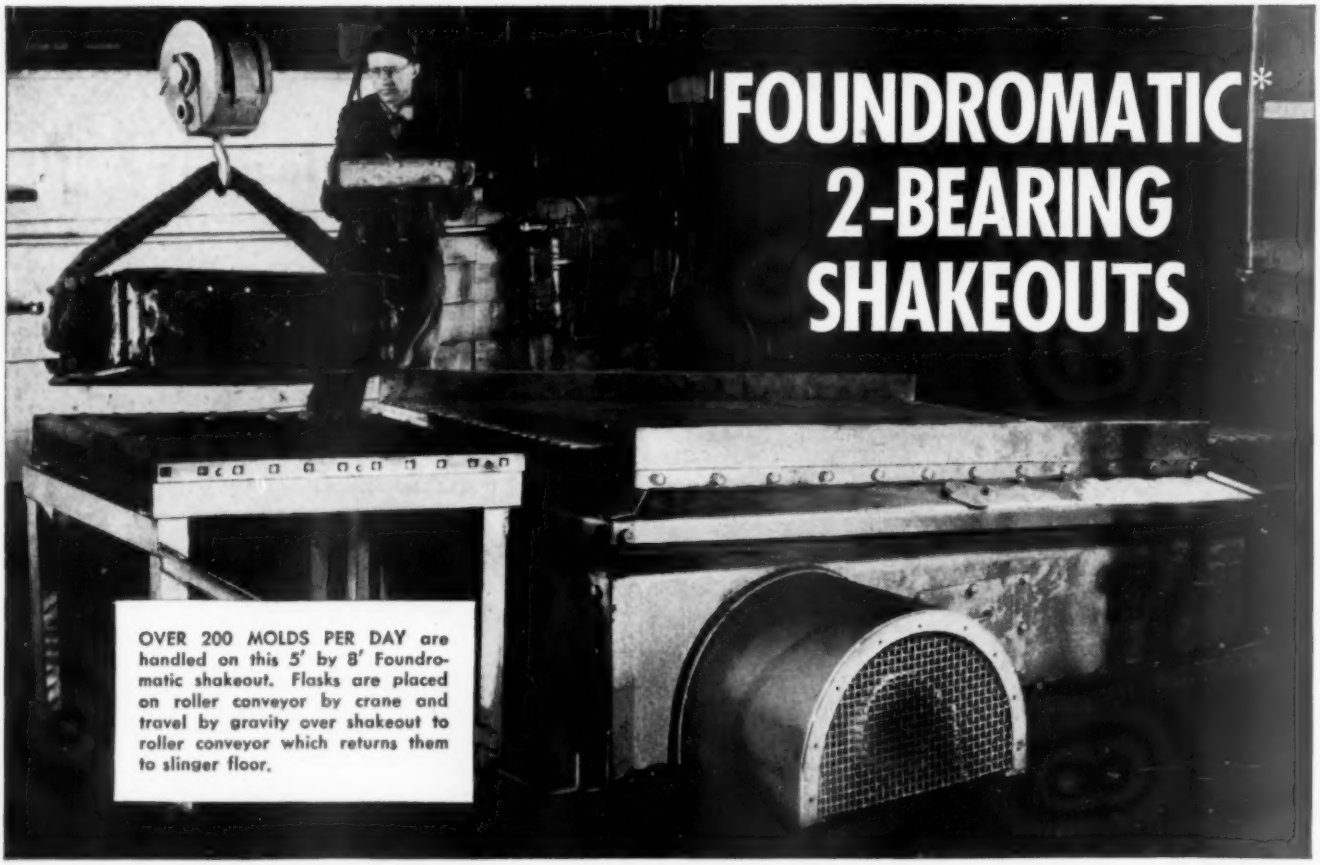
Apex intense search—and research—for improved alloys give you the quality Alloys That Are Best By Test—from Ingot to Casting.

Apex Smelting Company

Chicago • Cleveland

2537 WEST TAYLOR STREET, CHICAGO 12, ILLINOIS
6700 GRANT AVENUE, CLEVELAND 5, OHIO

NOW... in Stock



OVER 200 MOLDS PER DAY are handled on this 5' by 8' Foundromatic shakeout. Flasks are placed on roller conveyor by crane and travel by gravity over shakeout to roller conveyor which returns them to slinger floor.

A NUMBER of Foundromatic 2-bearing shakeouts, complete with motors and drives are now available in the following sizes: 4' by 6' Capacity 4 tons—5' by 8' Capacity 7½ tons — 6' by 8' Capacity 18 tons — and 8' by 10' Capacity 25 tons. These rugged, heavy duty units increase production . . . reduce flask maintenance . . . improve foundry working conditions.

And you take no chances when you specify Allis-Chalmers . . . for all A-C foundry equipment was developed and tested in its *own* foundries . . . designed to do its job right, with a minimum of expense. Consult Allis-Chalmers now about mechanized equipment for *your* foundry. ALLIS-CHALMERS, MILWAUKEE 1, WIS.

THESE 7 FOUNDROMATIC FEATURES GUARANTEE LONG, TROUBLE-FREE SERVICE

1. Body and shakeout deck are "all welded" . . . then stress relieved before machining for uniform strength.
2. Floating shakeout body is supported by resilient springs. No objectionable vibration can be transmitted to building.
3. Eccentric shaft produces effective vibratory motion. Castings and molds are freed in only a fraction of the time required with other methods.
4. Balance wheel and driven sheave are integrally constructed . . . no extra cost for sheave and flask breakage is minimized.
5. Entire weight of body and mold is carried by support springs. Bearings are required only to take care of centrifugal force of mechanism, resulting in longer bearing life.
6. Pivoted motor base maintains uniform V-belt tension . . . increases belt life.
7. No operating adjustments. Vibrating motion is positive and uniform up to maximum capacity. Large or small loads can be handled *without adjustment of any kind.*

SEND FOR NEW BULLETIN
0786092A, "Foundry Mechanization"—for information on the entire Allis-Chalmers line of foundry equipment.

CUPOLA BLOWERS
All practical sizes. These units can be equipped with air weight control for better cupola economy. Request Bulletin 1686048A.

COMPLETE A-C SCREEN LINE
Includes *Low-Head, Aero-Vibe, Ripl-Flo* and *Utah* electric screens for every foundry screening job.

REGULEX* CONTROL
for arc furnaces makes possible lower cost melts by raising and lowering electrodes in response to changing furnace conditions.

*Allis-Chalmers Trademark

A 2321

ALLIS-CHALMERS

One of the Big 3 in Electric Power Equipment — Biggest of All in Range of Industrial Products

A CENTURY OF SERVICE to Industry THAT MADE America Great

Announcing a

25% INCREASE IN CAPACITY RATINGS

of TIMKEN® bearings

MAKES POSSIBLE THE USE OF SMALLER BEARINGS, WITH SAVINGS IN SPACE, MATERIALS AND COST — A RESULT OF YEARS OF CONSTANT IMPROVEMENT IN TIMKEN BEARING QUALITY

IN the ten years since the present load capacity ratings of Timken tapered roller bearings were established, Timken bearings have been steadily improved. Improved so much that today the load carrying capacity of Timken bearings is a good *25% greater* than it was 10 years ago!

As a result, The Timken Roller Bearing Company is now able to announce a 25% increase in the load capacity ratings of all Timken bearings—following a careful review of laboratory studies on fatigue life machines over the past ten years, together with close observation of bearing performance in the field.

Permits Use of Smaller Bearings

Now you can safely carry your present bearing loads on smaller size Timken bearings. Reductions in size of shafts and housings are possible. Products can be made more compact — lighter in weight. You have an opportunity to save both on bearing costs and material costs. And this increase in ratings should enable engineers to utilize the advantages of Timken bearings in an even broader variety of applications than has been practicable in the past.

Result of Constant Quality Improvement

This 25% increase in Timken bearing capacity ratings is based on continued improvement in the quality of Timken tapered roller bearings over the past 10 years. It is due to a number of factors, including improved alloy steels made in our own Timken steel mill specifically for anti-friction bearings, better metallurgical control in the processing of this steel, more accurate manufacturing equipment, greatly improved surface finishes, and more accurate inspection methods. That these improvements in Timken bearing quality have resulted in 25% greater load capacity has been conclusively demonstrated by years of exhaustive laboratory and field studies!

New Engineering Journal to Give Facts

A new Timken Engineering Journal is now in preparation which will give complete capacity rating tabulations and will also include new bearings introduced since the last publication. Pending publication of the new Journal you may take full advantage of the 25% capacity increase by multiplying the existing ratings by 1.25.

For further assistance in the application of Timken bearings, call upon our field engineers or our Engineering Department.

Timken tapered roller bearings take any combination of radial and thrust loads, hold shafts in rigid alignment, assure precision and minimize friction. The 25% increase in load capacity ratings is the *latest* example of Timken leadership in serving the bearing needs of all industry . . . one more reason why it pays to look for the trade-mark "Timken" on every bearing you use. The Timken Roller Bearing Company, Canton 6, Ohio. Cable address: "TIMROSCO".

TIMKEN

TRADE-MARK REG. U.S. PAT. OFF.

TAPERED ROLLER BEARINGS

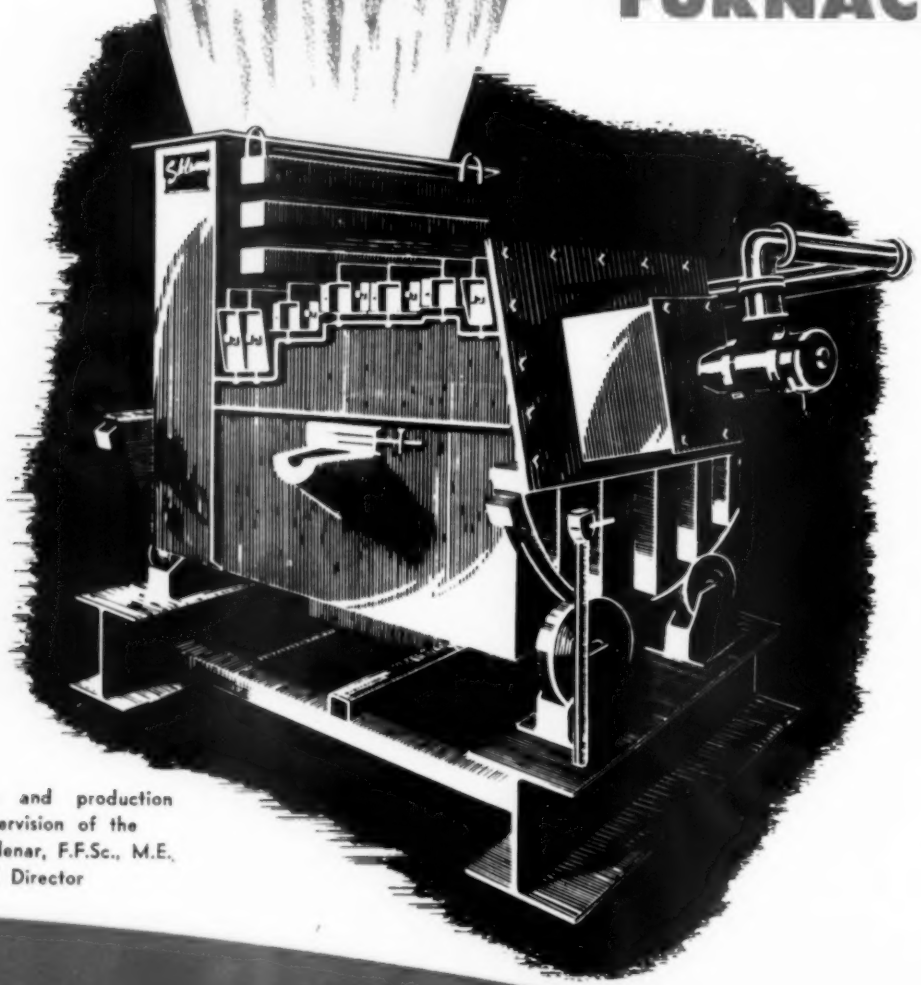
NOT JUST A BALL ◯ NOT JUST A ROLLER ▭ THE TIMKEN TAPERED ROLLER ▭ BEARING TAKES RADIAL ◫ AND THRUST ◫ LOADS OR ANY COMBINATION ✳

THE ORIGINAL

Sklenar

NEW IMPROVED REVERBERATORY FURNACES

The Modern Method of Melting Metals



All specifications and production under the supervision of the inventor, W. F. Sklenar, F.F.Sc., M.E., Technical Director

Patented, Patent Pending and Patents Applied for

SKLENAR FURNACE AND

WILSON INDUSTRIES,

38 MEMORIAL DRIVE- - - - - - -

. . . Maintenance Economy means

COMPARISON OF COSTS
(RED BRASS)

	SKLENAR	COST	CRUCIBLE TILT	COST
Total weight melted	259,270 lbs.		259,270 lbs.	
Number of heats	432			
Total hours labor (maint.)	26	26.52	64	65.28
Number Crucibles used (#120)			8	176.00
Fire brick	78	15.60		
Cement used	100 lbs.	8.90	400 lbs.	35.60
Fire clay used	400 lbs.	12.00	600 lbs.	18.00
Total hours labor daily for preparation	None		172 hrs.	175.44
Time of heats for melt	17 min. (600 lbs.)		40–50 min. (360 lbs)	
Total Maintenance Cost		$63.02		$470.32

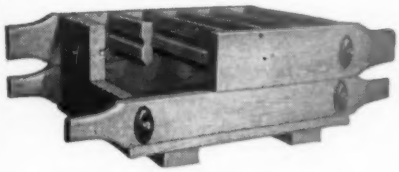
GREATER PROFITS

Alert foundrymen find the NEW IMPROVED SKLENAR REVERBERATORY FURNACE a boon in reducing melting costs . . . in increasing production of superior metals. The SKLENAR is the ONLY furnace that gives perfect combustion . . . perfect atmosphere control. Maintenance costs minimized; producible tonnage maximized. Write for our descriptive circular F-1 for complete details and specifications.

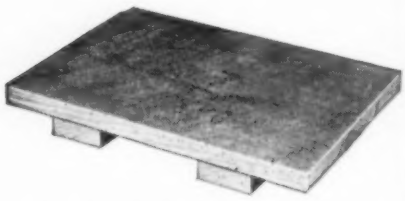
MANUFACTURING COMPANY
INCORPORATED *Sole Distributors*
CAMBRIDGE 42, MASS.

CMD FOUNDRY SPECIALTIES

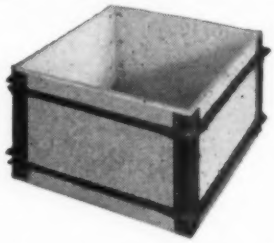
WEDGES
Hard or soft wood



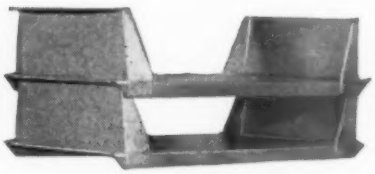
CMD WOOD FLOOR FLASKS
All sizes and shapes



CMD WOOD BOTTOM BOARDS
All sizes and shapes



CMD NON-WARP, NON-BURN SLIP JACKETS



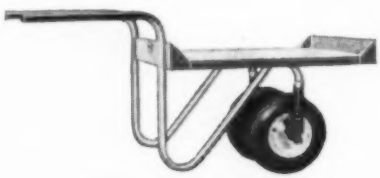
CMD DUAL-PURPOSE CORE TRAYS

CMD TYPE F CHIPPING HAMMER
Metal handle. Head has 2 chisels at right angles

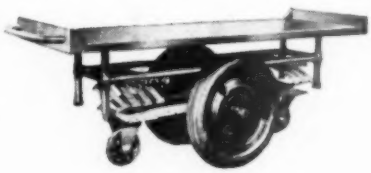
CMD TYPE C CHIPPING HAMMER
Combination drift and chisel

CMD TYPE A CHIPPING HAMMER
For general hand chipping

TEXTITE AIR SEPARATOR
Cools, cleans and dries the air in one operation. *No moving parts.* Saves air tools. Nothing to replace.



CMD PNEUMATIC CORE BARROWS
With single wheel or two wheels. (as shown here)



CMD PNEUMATIC CORE TRUCKS
Minimize core chafing and breakage

WRITE FOR BULLETINS
On CMD core-conveying equipment and other foundry specialties—preferred by experienced foundrymen for 25 years.

CHICAGO MANUFACTURING & DISTRIBUTING COMPANY

1928 WEST 46th STREET CHICAGO 9, ILLINOIS

An Engineering Achievement...

that means Better Service and Definite Savings for You!

JOY AXIVANE FAN APPLICATIONS

Apartment Houses
Aircraft
Air Conditioning Systems
Auditorium Ventilation
Automotive

Boiler Draft

Caves
Chemical Plants
Cleaners
Cooling Towers

Dehumidifiers
Diesel Engine Cooling
Dryers
Dust Collectors

Evaporative Condensers

Fan Heating Systems
Filtering Systems

Generator Cooling
Grain Drying

Hay Driers
Hair Dryers
Hospitals
Hotels
Humidifiers

Kitchens

Laundries

Mines

Oil Burners

Pharmaceutical Mfg.
Pneumatic Conveyors

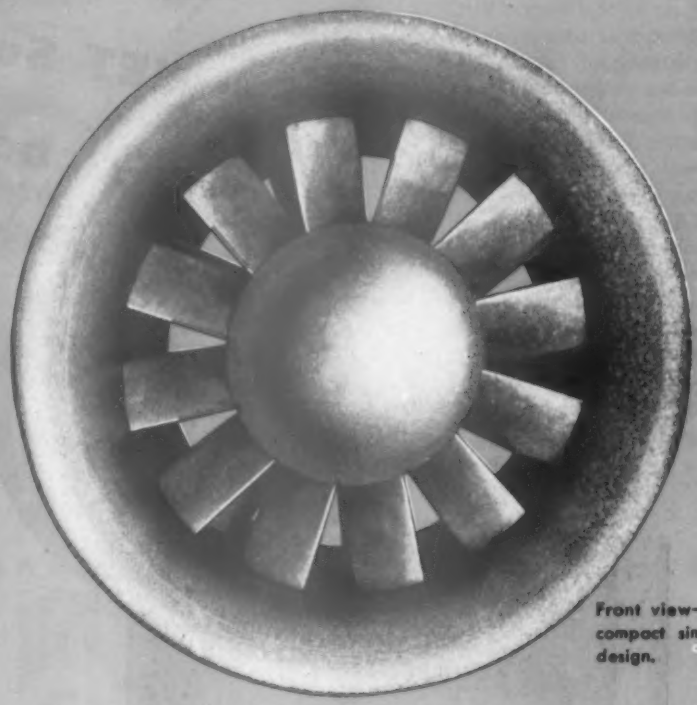
Railroad Cars
Refineries
Residence Heating

Schools
Ships
Stokers

Textile Mfg.
Tunnels

Unit Coolers
Unit Heaters
Vacuum Cleaners

Wind Tunnels



Front view—showing compact simplicity of design.

"SERIES 1000" *JOY AXIVANE FANS*

Write for our new complete Bulletin describing the Joy Axivane Fan and the "Series 1000" stock line. Now ready.

Consult a Joy Engineer

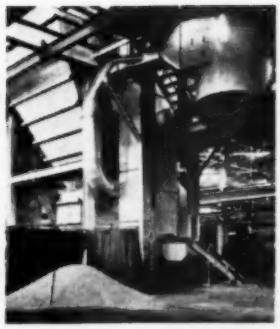
"Series 1000" is a line of stock fans with an unequalled range in size and volume.

This means quick delivery, and low maintenance, together with all the advantages of this remarkable Troller designed fan, such as—compactness, self-enclosed motor, on-the-job adjustable blades, less weight, less cost to install—a truly outstanding fan engineering achievement.

WAD

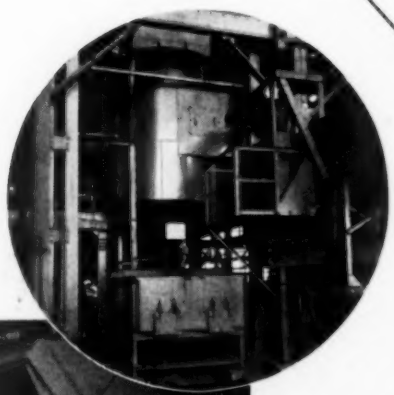
JOY MANUFACTURING COMPANY

GENERAL OFFICES: HENRY W. OLIVER BUILDING · PITTSBURGH 22, PA.

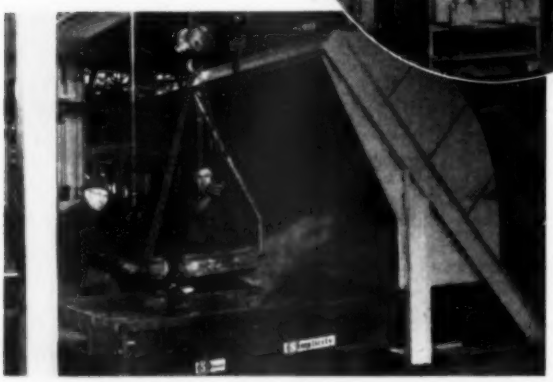


Vertical type "SH" Hydro-Clone collecting dust at its source from sand conditioning system.

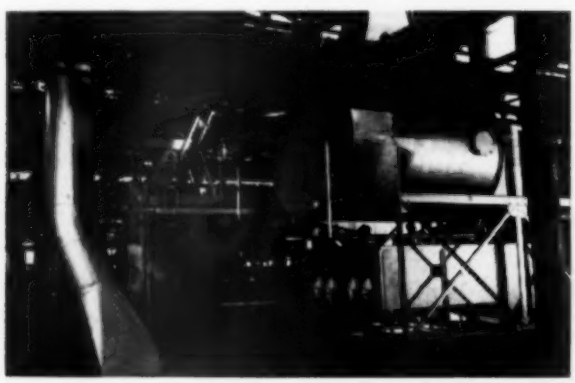
Hydro-Clone WET Suppression ends choking dust and gases



This compact type "SH" Hydro-Clone collects dust from iron, coke, and stone batch weigh hoppers.



Dust and gases at flask breaking are drawn to side hood for disposal in Hydro-Clone.



This horizontal low-headroom type "SHH" Hydro-Clone condenses shakeout and sand handling dusts into harmless sludge. Either ejector or manual type settling tanks available.

Whiting Hydro-Clone Equipment is engineered for foundry use. It uses water to reduce every particle of dust to harmless, easily disposable sludge, and absorb noxious gases and fumes.

Whiting applications remove dust and fumes at their source . . . from shakeouts, sand handling, and sand conditioning systems, cleaning rooms, etc. Thus air can be kept clean and pure throughout the foundry.

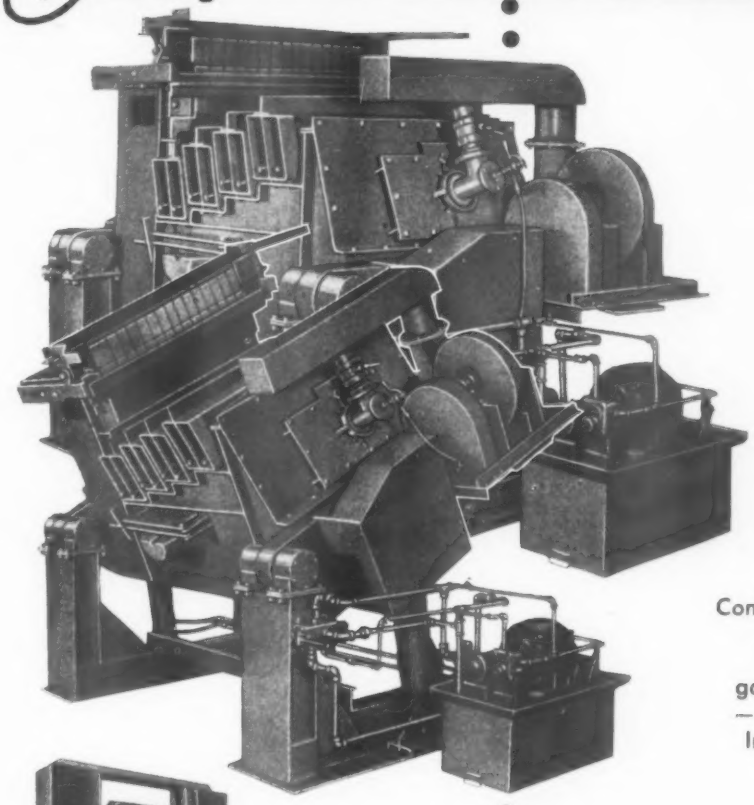
Whiting engineers will gladly help you plan a dust control system adequate for particular needs. Whiting Corporation, 15607 Lathrop Ave., Harvey, Illinois.

WHITING
CORPORATION

15607 Lathrop Avenue, Harvey, Illinois

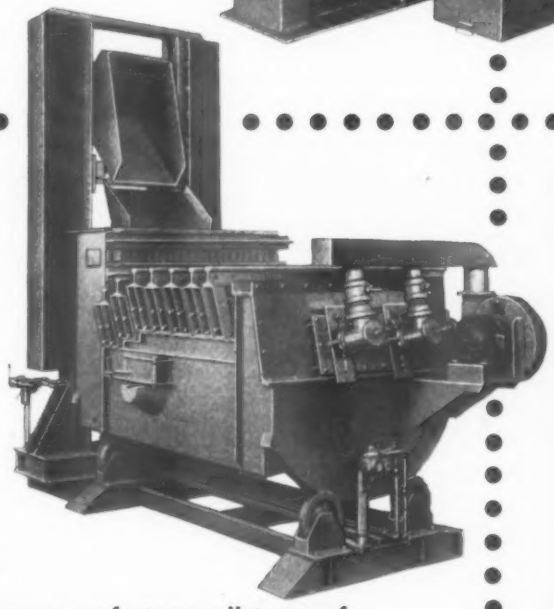
Offices in Chicago, Cincinnati, Detroit, Los Angeles, New York, Philadelphia, Pittsburgh, St. Louis, San Francisco. Agents in other principal cities. Canadian Subsidiary: Whiting Corporation (Canada) Ltd., Toronto, Ontario. Export Department: 30 Church Street, New York 7, N. Y.

Engineered TO MEET MODERN TRENDS



Stroman Economelt Furnaces now embody STATIONARY LIP POUR!

Stroman Economelt Direct Fired Reverberatory Furnaces now incorporate STATIONARY LIP POUR in their operation. This innovation which assures a constant pouring arc eliminates the necessity of moving the ladle at any time during a pour. It makes this furnace ideal for use with monorail, crane or buggy receptacles . . . speeds production and saves metal. Designed for fastest melting of Brass, Bronze, Grey Iron or Aluminum its efficient operation will effect up to 40% savings in fuel costs. Continuous charging, with cold metal never reaching the molten bath, makes it practically a continuous pour furnace. Economelt Furnaces may be fired by either gas or oil and are also available with combination gas — oil burners. Capacities range up to 2000 lbs. (Brass). Investigate its possibilities in your foundry, die casting or permanent mold plant at once.



★

Stroman manufactures all types of fuel fired furnaces for the melting of Iron, Grey Iron, Brass, Magnesium, Aluminum, and all other nonferrous alloys. Their efficient operation is unsurpassed in Foundries, Die Casting and Permanent Mold Plants. Write to-day for full information. Stroman Engineers will gladly consult with you on any of your melting room problems.

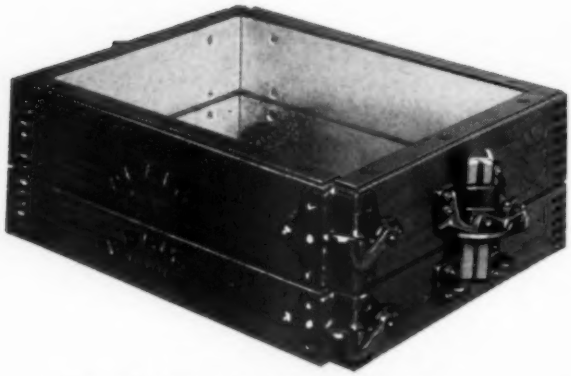
STROMAN SKIP HOISTS

For mechanical charging in conjunction with all Stroman Reverberatory Furnaces. Designed to give greatest efficiency to all charging operations . . . saves time and labor . . . easy to install . . . mechanizes the complete metal melting process. Built for either mechanical or pneumatic operation, in sizes to suit individual needs or furnace capacities.

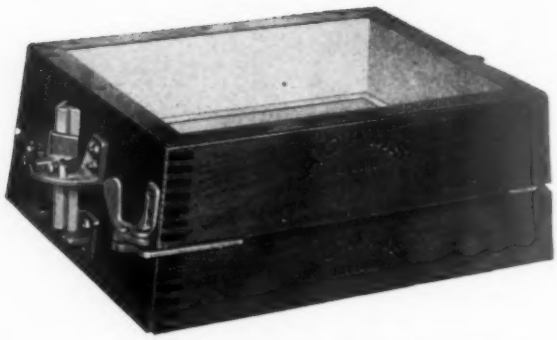
STROMAN FURNACE & ENGINEERING CO.

DIVISION OF

THE PETERSEN OVEN CO. • 9900 FRANKLIN AVE. • FRANKLIN PARK, ILL.

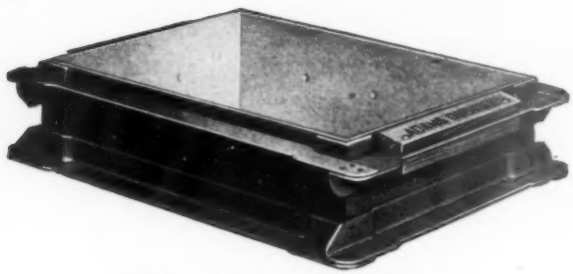


ADAMS CHERRY SNAP FLASKS
Straight or Tapered



ADAMS CHERRY SLIP FLASKS

ADAMS JACKETS
Cast Iron or Aluminum



ADAMS STEEL JACKETS

Design . . . Construction . . . Performance . . .

The Winning Combination

ADAMS CUSTOM-BUILT FLASK EQUIPMENT

When you use Adams Flask Equipment you are assured the superior performance that means peak production. Adams Cherry Slip Flasks or Cherry Snap Flasks used with Adams Cast Iron, Aluminum or Steel Jackets are a combination hard to beat for accuracy, convenience and economy. Remember—all Adams Flask Equipment is made by experienced craftsmen to your exact specifications.

The "Adams" line of foundry

SNAP FLASKS, CHERRY
SLIP FLASKS, CHERRY OR ALUMINUM
EASY-OFF FLASKS, CHERRY OR ALUMINUM
JACKETS, CAST IRON, STEEL OR ALUMINUM
BANDS, STEEL—MATCH FRAMES
PRESSER BOARDS—BOTTOM PLATES

ALSO AVAILABLE—Adams Flask Equipment in round or special shapes to conform with your pattern equipment.

THE ADAMS
DUBUQUE,

MOLDING MACHINES . . . . . FLASK

For Peak Production

production items includes:

VIBRATORS—TUBULAR SPRUE CUTTERS
JOLT-SQUEEZE-MOLDING MACHINES,
SIDE ROD TYPE AND POST TYPE
HAND OPERATED SQUEEZERS
JOLT-SQUEEZE-PATTERN-DRAW MOLDING
MACHINES, SIDE ROD TYPE
AND POST TYPE

ADAMS UNIVERSAL JOLT SQUEEZERS

Equally efficient as jolt-squeeze-pattern-draw machines or plain jolt squeezers, these simply designed production units will reduce production costs and minimize rejects. Their operation is so simple and easy that no special skill is required to maintain uninterrupted high production levels. Available in both post and side rod types, stationary and portable.

WRITE FOR descriptive literature detailing the production—boosting features of Adams foundry equipment line. THE ADAMS COMPANY, 800 Foster St., Dubuque, Iowa.

COMPANY

IOWA, U.S.A.

EQUIPMENT . . . . . Established 1883

1928-1948

20th Anniversary of . . . .

The *Original* Light-Weight Welded Alloy Heat-Treating Equipment

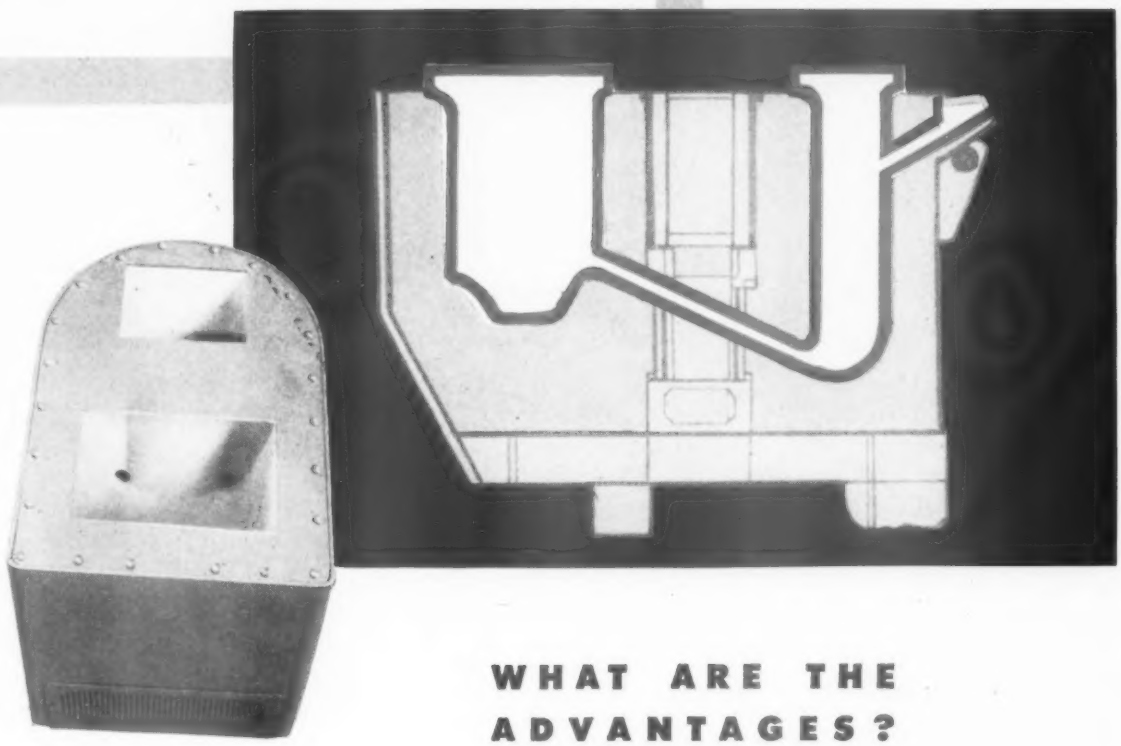
A revolutionary type of heat-treating equipment was introduced by The Pressed Steel Company in 1928. By cutting 2/3 off the weight of annealing and carburizing units, a wide new field for savings in fuel, and heat-treating as well as handling time was opened up. Introducing the use of sheet-welded alloy, this new-type annealing and carburizing equipment was also less bulky, thus increasing furnace capacity as much as 100%. Actual savings of many thousands of hours are shown by records of "Pressed Steel" installations, some of which were made in the 20's and are still in excellent condition. "Pressed Steel" annealing and carburizing boxes, covers, baskets, racks, tubes, retorts, etc., have been designed for every imaginable product. Also thermocouple protection tubes and welded alloy tubing to specification. Send us blue-prints or write as to your needs.

THE PRESSED STEEL COMPANY
of WILKES-BARRE, PENNSYLVANIA

Industrial Equipment of Heat and Corrosion Resistant WEIGHT-SAVING *Sheet Alloys*

★ ★ ★ OFFICES IN PRINCIPAL CITIES ★ ★ ★

Why Two Chambers in the *LINDBERG–Fisher* INDUCTION MELTING FURNACE



WHAT ARE THE ADVANTAGES?

Cleaner molten metal. Residue remains in charging chamber—either floating at surface or sinking to bottom. Only clean, residue-free metal passes to second chamber for pouring.

Metal always at pouring temperature. Adding cold metal to charging chamber does not affect temperature in pouring chamber, within reasonable operating limits.

Less scrap loss. Set furnace for a lower maximum casting temperature. Plus or minus 5° F. temperature control eliminates possibility of over- and undershooting.

Easier cleaning. Pouring chamber seldom requires cleaning as only residue-free metal reaches it. Straightline melting channels clean easily.

Less maintenance. Refractory-lined chambers—no crucibles or pots to replace. No burners to clean.

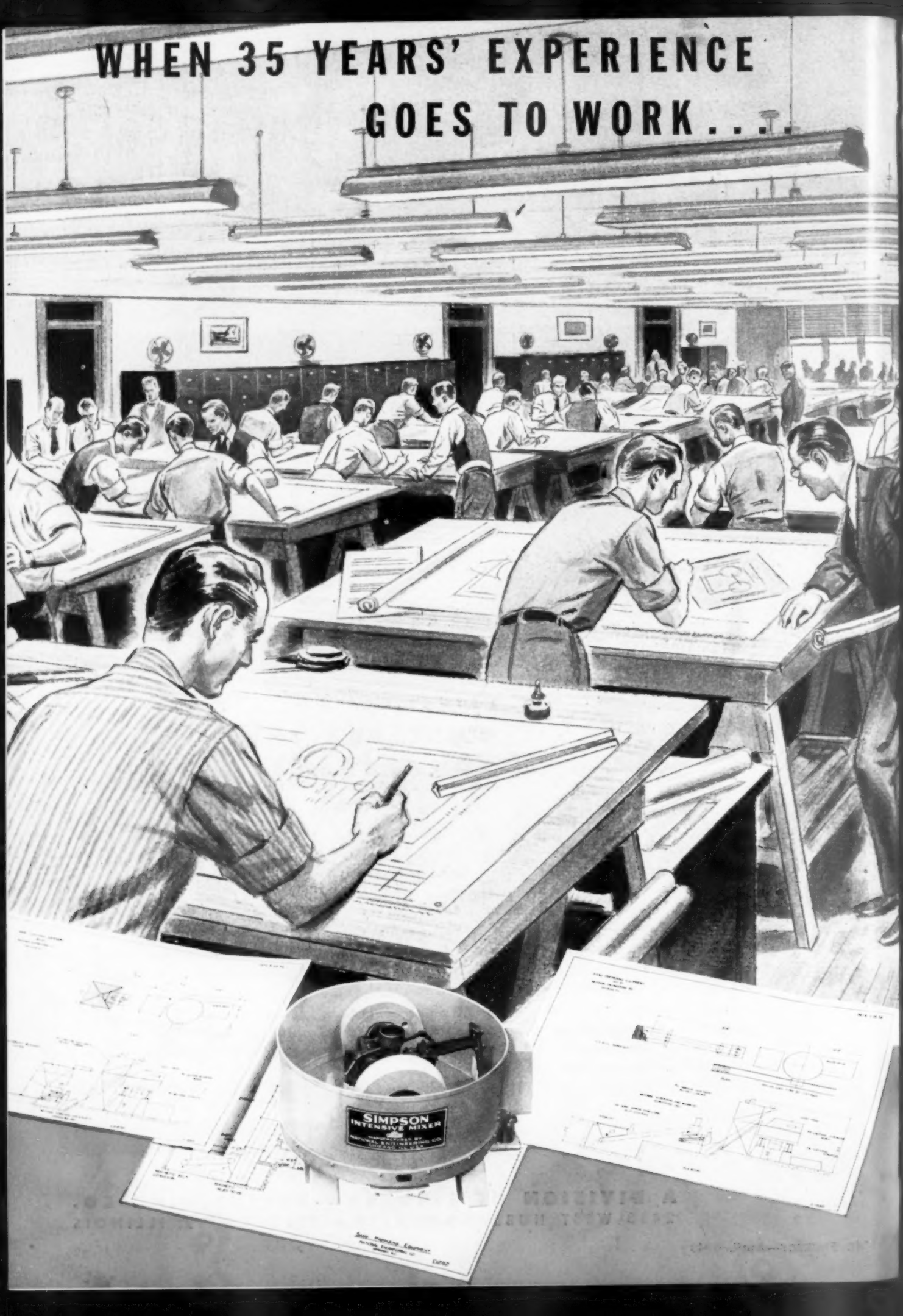
Cooler operation. Induction heating heats metal only, not the entire furnace. Covered chambers prevent heat radiation except when charging or ladling.

Now . . . a complete line of melting furnaces—gas, oil, electric

Fisher Furnaces

A DIVISION OF LINDBERG ENGINEERING CO.

2453 WEST HUBBARD STREET • CHICAGO 12, ILLINOIS


WHEN 35 YEARS' EXPERIENCE
GOES TO WORK . . . .
SIMPSON
INTENSIVE MIXER

....A STRAIGHT LINE TO SAND CONTROL EFFICIENCY

NATIONAL *Engineering Service*

FOUNDRY Sand Control Engineering has been the special province of National Engineers for thirty-five years. During this time they have designed and engineered sand systems and equipment for hundreds of foundries, large and small, of all types: magnesium, aluminum, iron, steel, brass and bronze. They have helped foundries produce the highest quality castings at the lowest net cost per ton.

A broad background of practical foundry experience and years of concentration on the proper solution to foundry sand problems equips National Engineers to layout, design and build the right system for the special requirements of any foundry. This means top operating efficiency is achieved — and maximum production with savings in time, labor, power and materials possible in nearly every case.

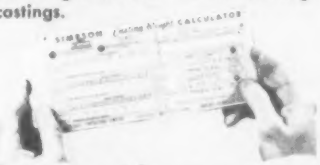
If you are seeking the shortest route to proper sand preparation, handling, reclamation, storage and control let National Engineering experience help you. Whether it is a problem of today or part of your long range planning, a National Engineer will gladly work it out with you.

FIELD SERVICE

National engineers are on the job constantly helping foundries solve problems of sand handling and control on construction, maintenance, repair or new requirements.

CASTING WEIGHT CALCULATOR

Many thousands of these simple, easy-to-use calculators have been distributed throughout the foundry industry. They help save time and avoid guesswork in estimating castings.



MOLDING COST CALCULATOR

This handy Simpson Molding Cost Calculator computes molding cost per ton of castings—number of molds needed for certain number of castings—weight of metal needed to pour remaining molds and cubic content of the mold. Free to foundrymen—write for yours.

SIMPSON

INTENSIVE MIXERS

NATIONAL ENGINEERING COMPANY

MACHINERY HALL BUILDING • CHICAGO 6, ILLINOIS

Manufacturers and Selling Agents for Continental European Countries—The George Fischer Steel & Iron Works, Schaffhausen, Switzerland. For the British Possessions, Excluding Canada and Australia—August's Limited, Halifax, England. For Canada—Dominion Engineering Co., Ltd., Montreal, Canada. For Australia and New Zealand—Gibson, Battle & Co., Pty., Ltd. Sydney, Australia

Airco helps write new history for steel production

Early in 1946 Airco introduced in the United States a new combustion method that is pointing the way to future open hearth economies. This new technique, employing the oxygenated fuel flame, helps reduce meltdown time by accelerating the heat input rate.

Another forward step was taken in the summer of 1946. At that time, decarburization of steel by gaseous oxygen in open hearth furnaces was introduced. This promising technique, which is exciting the imagination of steel makers, involves a practical method of injecting oxygen directly into the molten steel bath through the slag cover.

Air Reduction, recognizing the importance of these developments, made the facts concerning them immediately available to the entire industry.

Now, this same forward thinking is at work in the perfection of other metallurgical uses of industrial gases for flushing, desiliconization, desulphurization, and similar related processes.

• • • •

For more data on oxygen as an aid to combustion and decarburization in the open hearth, as well as data on other new processes as they are developed, write us immediately. We will place your name on a list to receive all releases as they come out. Address: Dept. F 8119, Air Reduction, New York 17, N. Y. In Texas: Magnolia Airco Gas Products Company, Houston 1, Texas. On West Coast: Air Reduction Pacific Co., San Francisco 4, Calif.

AIRCO **AIR REDUCTION**

Offices in All Principal Cities

Headquarters for Oxygen, Acetylene and other gases . . . Carbide . . . Gas Welding and Cutting Machines, Apparatus and Supplies . . . Arc Welders, Electrodes and Supplies

GOOD INGOT, AND ALL THIS TOO!

In Federated ingot you get the exact metal you specify, PLUS all these intangible ingredients. These background factors mean service and security . . . they mean that you get *consistently* better ingot to help you do a *consistently* better job.

For any non-ferrous metal—brasses, bronzes, other copper alloys; deoxidizers, hardeners; alloys of aluminum, magnesium, zinc—see Federated first.

Federated
METALS DIVISION

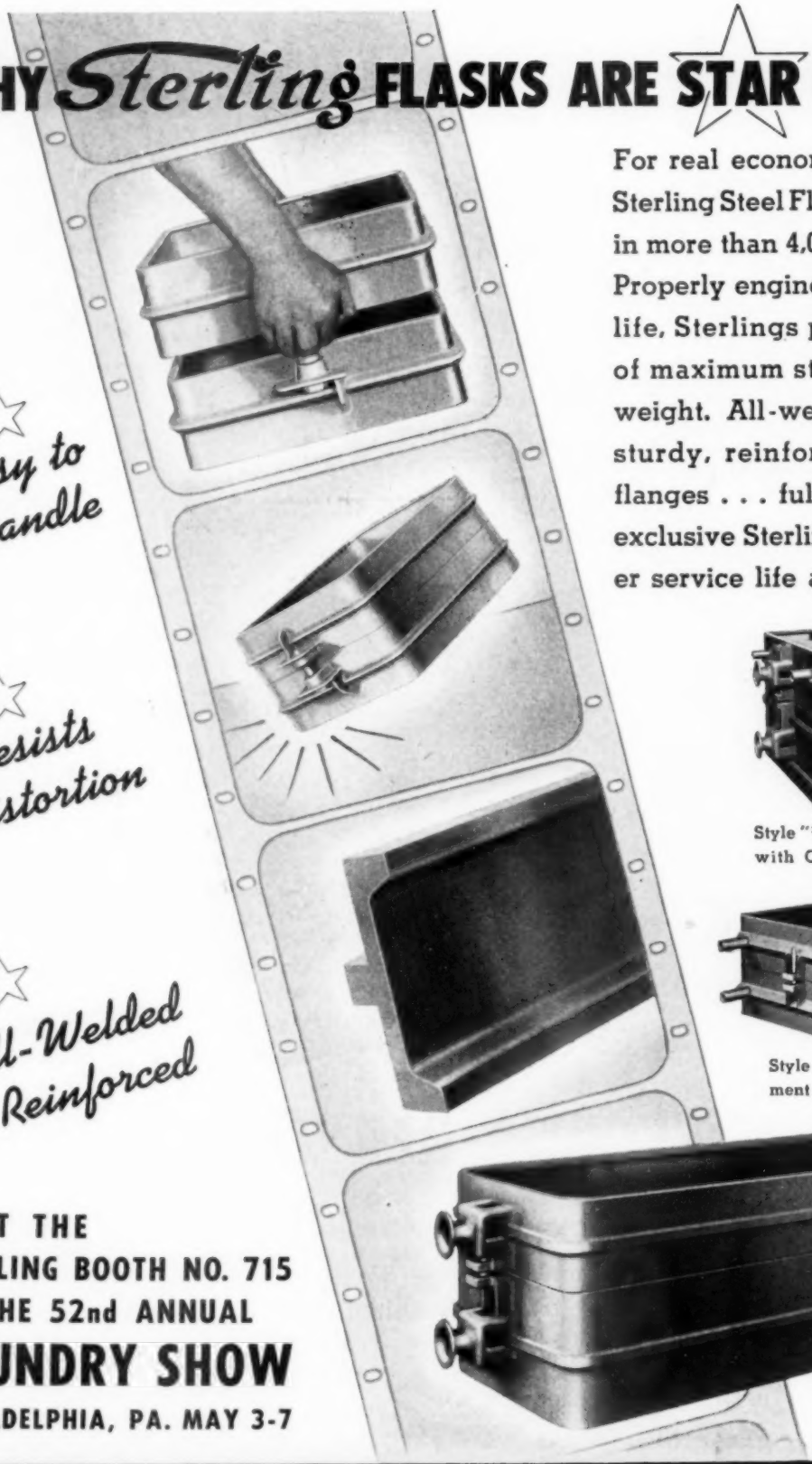
AMERICAN SMELTING AND REFINING COMPANY
120 BROADWAY, NEW YORK 5, N. Y.

Federated first in the non ferrous field FMD

F-CC1f

WHY *Sterling* FLASKS ARE STAR PERFORMERS

For real economy and lasting service, Sterling Steel Flasks are star performers in more than 4,000 American foundries. Properly engineered and built for long life, Sterlings provide a combination of maximum strength with minimum weight. All-welded construction . . . sturdy, reinforcing ribs . . . square flanges . . . full-width bearing. These exclusive Sterling features insure longer service life at lower cost.

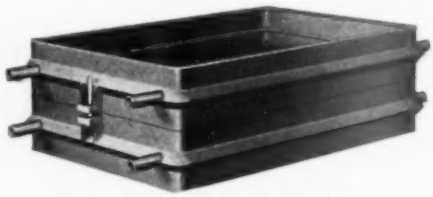


Easy to Handle

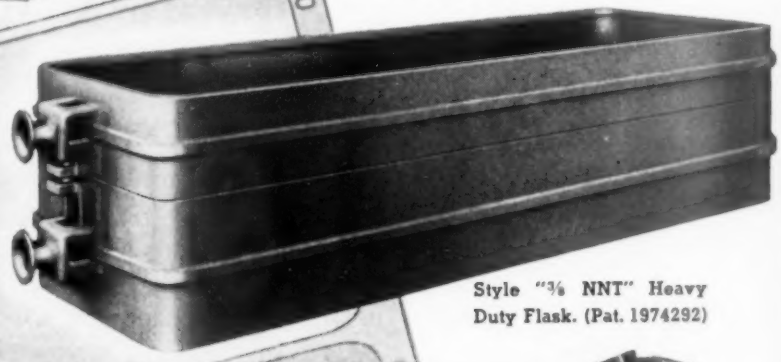
Resists Distortion

All-Welded Reinforced

Style "3/8 NT-NNT" Heavy Duty Flask with Clamping Bars and Clamps.



Style "LL" with Angle Reinforcement and Two Man Lift Handles.



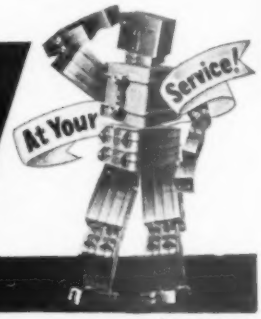
Style "3/8 NNT" Heavy Duty Flask. (Pat. 1974292)

VISIT THE STERLING BOOTH NO. 715 AT THE 52nd ANNUAL

FOUNDRY SHOW

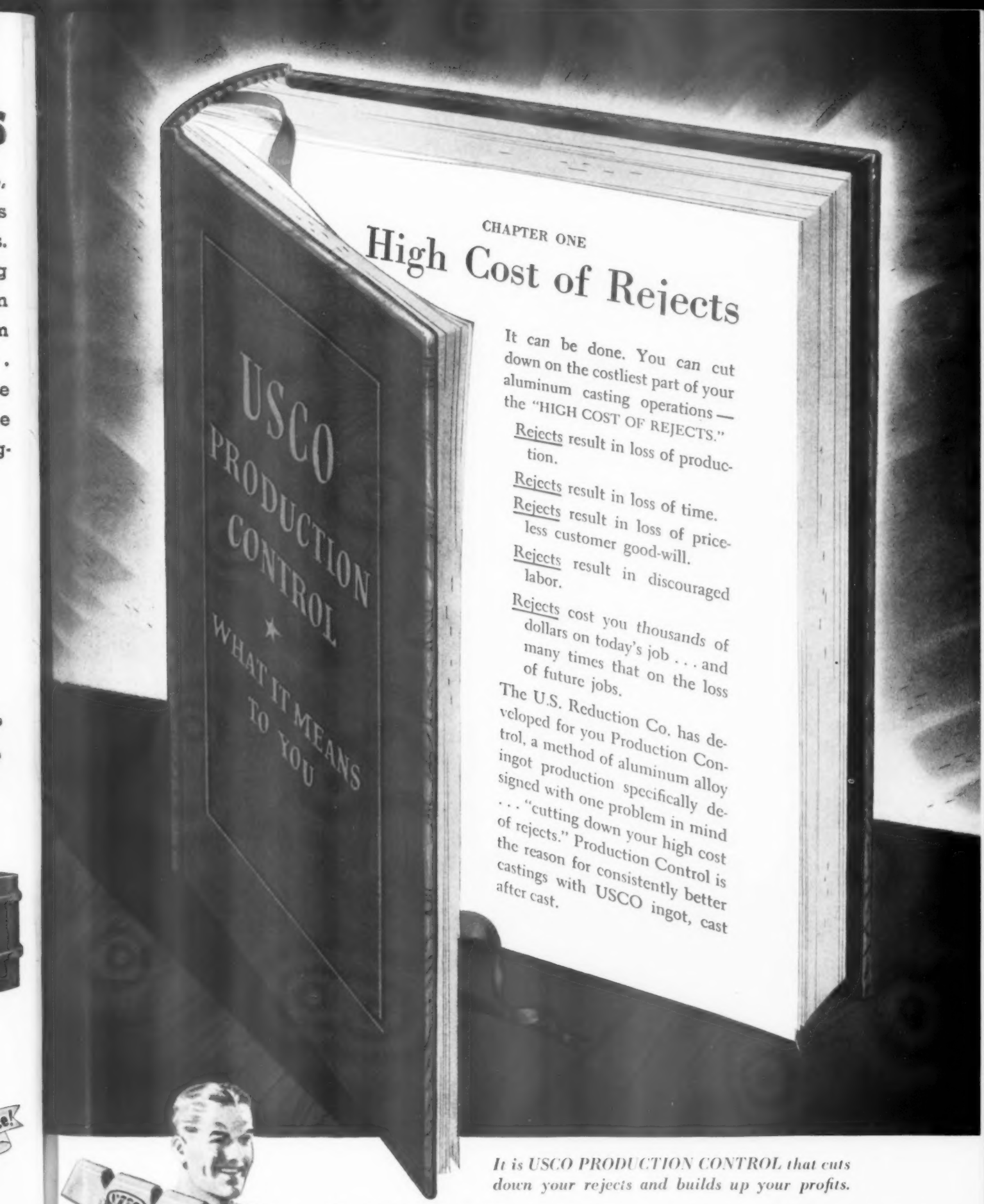
PHILADELPHIA, PA. MAY 3-7

Sterling FOUNDRY FLASKS



STERLING WHEELBARROW COMPANY • Milwaukee 14, Wis., U.S.A.

A 5117-1P



CHAPTER ONE

High Cost of Rejects

It can be done. You can cut down on the costliest part of your aluminum casting operations — the "HIGH COST OF REJECTS."

Rejects result in loss of production.

Rejects result in loss of time.

Rejects result in loss of priceless customer good-will.

Rejects result in discouraged labor.

Rejects cost you *thousands* of dollars on today's job . . . and many times that on the loss of future jobs.

The U.S. Reduction Co. has developed for you Production Control, a method of aluminum alloy ingot production specifically designed with one problem in mind . . . "cutting down your high cost of rejects." Production Control is the reason for consistently better castings with USCO ingot, cast after cast.

It is USCO PRODUCTION CONTROL that cuts down your rejects and builds up your profits.

USCO ALUMINUM

Pioneer Producers of Quality Aluminum Ingot

U. S. REDUCTION CO. *East Chicago, Ind.*

GAS.. PRODUCTION-LINE FUEL

Homestead Lever-Seald Valve—for handling fluids at high pressures and temperatures—one of the multitude of Homestead Valves for all types of applications.

Gas-fired "SKLENAR" Furnace for high-speed melting of ferrous metals.

Sectional Gas-fired core-drying oven.

for

FOUNDRY MODERNIZATION

Foundry modernization is a continuing project at Homestead Valve Manufacturing Company, Inc., Coraopolis, Pa., because Homestead engineers have since 1892 kept their sights set on modern productioneering equipment and methods.

And, in their research, these engineers have investigated fuels and combustion techniques as they apply to foundry practice. As a result the productive flames of GAS are increasingly important and more extensively used in Homestead's production lines.

Modern Gas-fired Foundry Equipment, such as the "SKLENAR" furnaces for ferrous metal-melting, utilize the special characteristics of GAS—flexibility, controllability, speed. This saves equipment space, melting time, and lining maintenance. Operating at 2700° F. these furnaces have a capacity of one ton heat per hour, and 160 heats per lining—evidence that modern Gas Equipment is really productioneering equipment.

But this is not the only GAS application in the manufacture of Homestead valves. Core ovens, annealing furnaces, and non-ferrous crucible furnaces are all heated by the productive flames of GAS. If you haven't investigated modern Gas-fired Foundry Equipment recently, your local Gas Company Representative will bring you up to date.

AMERICAN GAS ASSOCIATION
420 LEXINGTON AVENUE, NEW YORK 17, N. Y.

MORE AND MORE...
THE TREND IS TO GAS
FOR ALL INDUSTRIAL HEATING

CORROSION RESISTANCE

FRONTIER ALLOY "40-E"

A HIGH STRENGTH ALUMINUM *Alloy* THAT NEEDS NO HEAT TREATMENT

The metallurgical formula of Frontier "40-E" Alloy overcomes the corrosion danger commonly encountered in certain types of aluminum alloy containing zinc. Frontier "40-E" is highly resistant to the action of corrosive atmospheres and liquids. What's more this desirable corrosion resistance is applicable to the metal under stress (stress corrosion) as well as to unstressed sections. Here, definitely, is significant development in the field of aluminum alloys.

ENGINEERING DATA ON REQUEST

The Frontier Alloy Data Book brings pertinent engineering and metallurgical facts on the physical properties of "40-E". In writing for your free copy, please state company name, your title, and address.

Licensing franchises now available in certain areas to meet the increasing demand for Frontier "40-E" Alloy. Details on request.

1. **Shock Resistance**—Tests have proved its exceptional ability to withstand explosive shock and standard impact shock.
2. **Corrosion Resistance**—Excellent, not only in standard corrosion tests but also under stress.
3. **High Yield Strength**—A dominant factor where distortion or misalignment of parts would make the assembly inoperable.
4. **Machineability**—Far superior to the usual sand cast aluminum alloys and machined parts have a high lustre.
5. **Pressure Tightness**—The fine grain of the alloy enables it to withstand high pressures.
6. **No Heat Treatment**—Physical properties are obtained by natural aging at room temperatures.

Specifications — Army-Navy Aeronautical Spec. AN-A 17, U. S. Navy Bureau of Ships Spec. 46A-1 (INT), Class 1, A. S. T. M. Spec. B26-42T, Alloy ZG-41, S. A. E. 310.

Typical Physical Properties — tensile strength, 35,000 psi.; yield strength, 25,000 psi.; elongation, 5% in 2".

FRONTIER BRONZE CORPORATION
4878 PACKARD ROAD
NIAGARA FALLS, NEW YORK

Sterling

Vitrified and Resinoid Snagging Wheels for Extra Hours of Better, Faster Grinding

To obtain higher production and, at the same time, lower snagging costs, more and more workers and foremen find Sterling Snagging Wheels are by far the best obtainable. Careful attention to the small details of your job results in better than ordinary wheels—faster-cutting ones, too!

Under some conditions, vitrified wheels, running between 5500 and 6500 surface feet per minute are most suitable. Other jobs demand resinoid wheels operating between 9000 and 9500 surface feet per minute. The determining factor can be obtained by consultation with a Sterling engineer.

Skilled by years of experience on hundreds of different snagging jobs, the Sterling engineer can give valuable advice regarding the proper "Wheel of Industry" to use. In addition, the services of our laboratory technicians and plant engineers are yours to assist in selecting the "wheel in a thousand" your particular job needs.

May we serve you?

"THE WHEELS OF INDUSTRY"

• The Sterling Selector gives suggested specifications for the many types of grinding. Send for it!

• STERLING ABRASIVES •

THE STERLING GRINDING WHEEL DIVISION
OF THE CLEVELAND QUARRIES COMPANY
TIFFIN, OHIO

THE WHEELS OF INDUSTRY

Stainless Steel is TOUGH

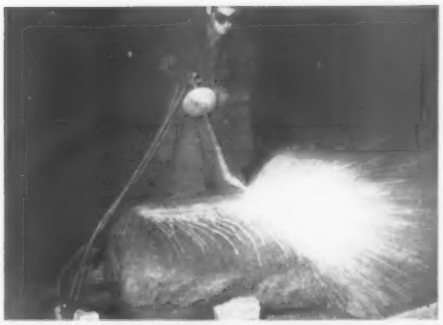
tough to cut, too—but LINDE makes the job easier . . . just as easy as cutting carbon steel

LINDE's powder-cutting process overcomes the barrier to fast and economical cutting of stainless or chromium steels.

By means of easily installed attachments for standard oxy-acetylene equipment, powder-cutting can be done without substantial change from carbon steel cutting techniques.

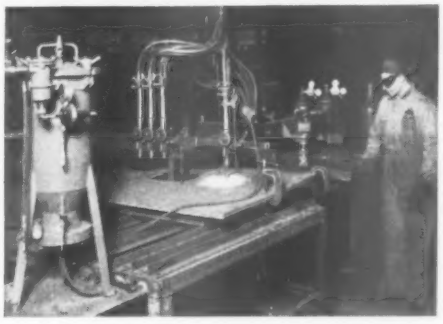
IN FOUNDRIES—

by powder-cutting, risers are removed 20 times faster than by older methods. Removal of riser pads and gouging out defects can be done at considerable savings in cost.



IN STEEL MILLS—

a 12,000-lb. ingot can be powder-scarfed in 4 to 6 hours—about 1/10 the time required for grinding. Sizing of ingots, billets, and slabs, removal of hot tops, scrapping operations, and many other cutting jobs can be done in a fraction of the time previously required.



IN FABRICATING PLANTS—

a stack of twelve 10-ga., type-304 stainless sheets were powder-cut at 8 in. per min. . . . 4-in. I.D. by 8-in. O.D. flanges on 1/2 in., type 316 plates were made in 2 minutes of cutting time apiece.

If you work with stainless steel you will want to know more about this LINDE process. LINDE can supply the equipment you need, help you to set up, and supply the training help you need.

Linde

The word "Linde" is a registered trade-mark of The Linde Air Products Company.

THE LINDE AIR PRODUCTS COMPANY

Unit of Union Carbide and Carbon Corporation

30 East 42nd St., New York 17, N. Y. UCC Offices in Other Principal Cities

In Canada: DOMINION OXYGEN COMPANY, LIMITED, Toronto

Tests prove that
HYDRO-BLAST CLEANS AIR IN A FOUNDRY

THAT the air in a foundry gets cleaned by operation of Hydro-Blast has never been seriously questioned. As a general proposition it is acknowledged that the dust concentration within 50 feet of a Hydro-Blast unit drops 50 per cent within half an hour after Hydro-Blast operation is begun.

To give foundrymen facts instead of generalities, Hydro-Blast Corporation reports the results of a series of dust count tests, made in representative foundries for Hydro-Blast by Warren F. Terry, consulting engineer and nationally known authority on air analyses and dust counts.

Mr. Terry's findings are to be presented in a series of summarized reports. Foundry names will not be mentioned; the complete reports are in the files of Hydro-Blast Corporation. The first report is shown on the opposite page.

Alert foundrymen, it is believed, will see from these reports what a valuable contribution Hydro-Blast can make to more attractive working conditions as well as to important operating economies.

If you are determined to minimize dust, we suggest a consultation with Hydro-Blast engineers as a constructive step in the right direction.

Report of Dust Count Tests in a steel foundry producing large castings

Foundry in full operation.

Hydro-Blast room 24′ long, 22½′ wide and 16½′ high; solid roof; located in the side foundry bay.

Fifteen windows approximately 5′x5′ tilted about half open, scattered along in the monitor the entire length of the building on the side over the Hydro-Blast.

About 25 feet from the Hydro-Blast room, four chippers removing sand cores from large castings.

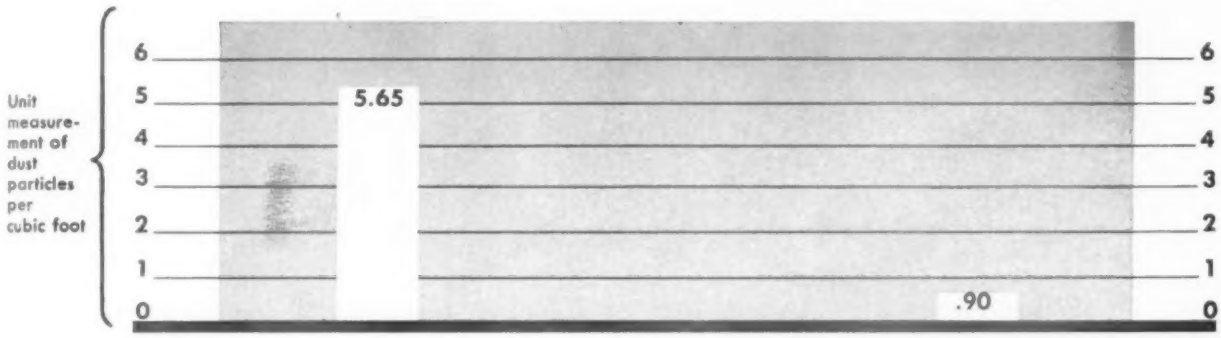
About 20 feet away, a swing-frame grinder operator at work on a large casting about 10 feet in diameter.

About 40 feet away, a sand blast in operation, with considerable dust escaping beneath the door.

1 **Tests made outside Hydro-Blast room at breathing level . . . at a point about 10 feet away, to determine the general concentration of foundry air**

SAMPLE 1
Before Blasting
. . . Hydro-Blast doors open.
Duration—20 minutes.

SAMPLE 2
Immediately After Blasting
. . . doors closed.
Duration—30 minutes.



2 **Tests made inside Hydro-Blast room at breathing level**

SAMPLE 3
Before Blasting
. . doors open; simultaneous with Sample 1.
Duration—20 minutes.

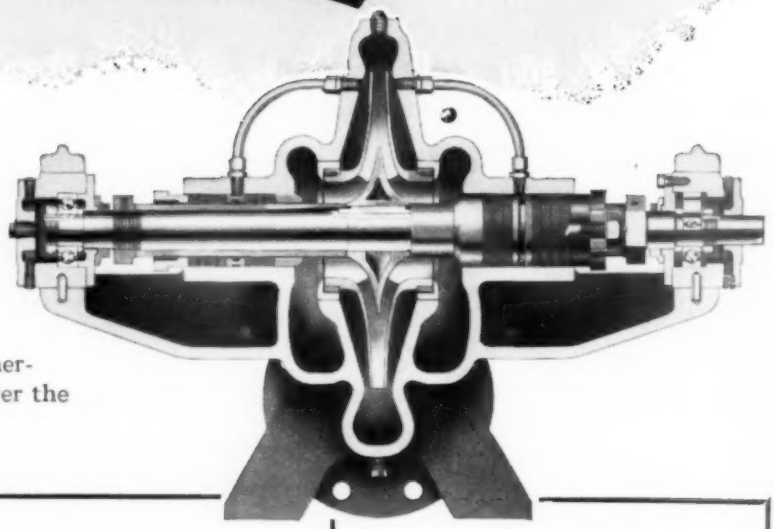
SAMPLE 4
Immediately After Blasting
. . . doors closed; simultaneous with Sample 2 to determine settling rate of fine particles held in suspension.

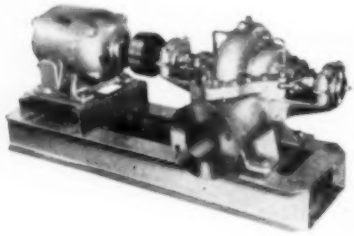
HYDRO-BLAST
2550 N. WESTERN AVENUE • CHICAGO 47, ILLINOIS

INSIDE Engineering makes the difference

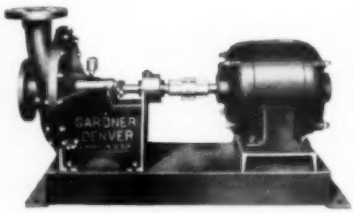
YOU can't judge a centrifugal pump from the *outside*. It's the inside that makes or mars the pump's efficiency. Inside, Gardner-Denver pumps are hydraulically and mechanically right. Foundry practices are rigidly controlled to form extremely smooth castings. Correctly proportioned water passages produce a uniform flow of water by eliminating eddies, backwaters and sudden changes in velocity.

Check over your pumps, then call a Gardner-Denver sales engineer—at your service all over the world—to help plan the correct pumping installation for you.

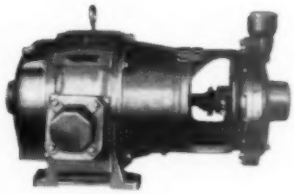




Gardner-Denver Horizontally Split-Case Double-Suction Centrifugals for large capacities. Available in sizes for all heads up to 300 feet.



Gardner-Denver Side-Suction Centrifugals for general utility service. Made in capacities up to 1600 gallons per minute at heads up to 100 ft.



Gardner-Denver Close-Coupled Centrifugals function in any position. Capacities up to 1250 gallons per minute at heads up to 250 ft.

For complete information, write Gardner-Denver Company, Quincy, Illinois

GARDNER-DENVER SINCE 1859

CUTS GRINDING TIME 40%

THIS midwestern fabricating shop called in the Rotor Application Engineer to find out how they could cut costs. He checked air pressures with the Rotor Needle Type Tester and found that pressure at the grinders was only 60 lbs., although they had 95 lbs. in the main line. Hose was too small (½″), and ¼″ nipples and hose menders were choking off the pressure. He recommended *light, flexible* ¼″ Rotor Hose and ½″ nipples. Results:

Increased pressure *at the tool* to 85 lbs.

Cut grinding time 40%.

Similar changes and improvements were made in other air production lines.

Cost savings due to increased production *paid entire cost* of new hose installation *in less than two weeks.*

The Rotor Application Engineer would be glad to check over *your* air pressures to cut *your* costs. No obligation.

AIR O'TOOL

FROM THIS MOUND

better MELTING!

better MOLDING!

In this form, it's petroleum coke... just a good fuel. But it is potential *graphite,* too! Properly processed, it will become graphite electrodes, molds, mold plugs, and the variety of specialized graphite products made by International that show the way to increased production and lower costs.

Graphite resists thermal shock—it will not crack, spall or chip. Its low thermal expansion insures castings true to specified dimensions. Molten metal does not "wet" graphite—no sticking in the mold. And graphite has virtually no melting point—ingots and castings are free of inclusions. In addition, it is light in weight, low in cost.

These properties of graphite may suggest new time and cost saving applications in your plant or help you to solve difficult melting, casting and molding problems. International supplies graphite in blocks, tubes, slabs, or machined to your specifications—and graphite electrodes for all types of electric furnaces.

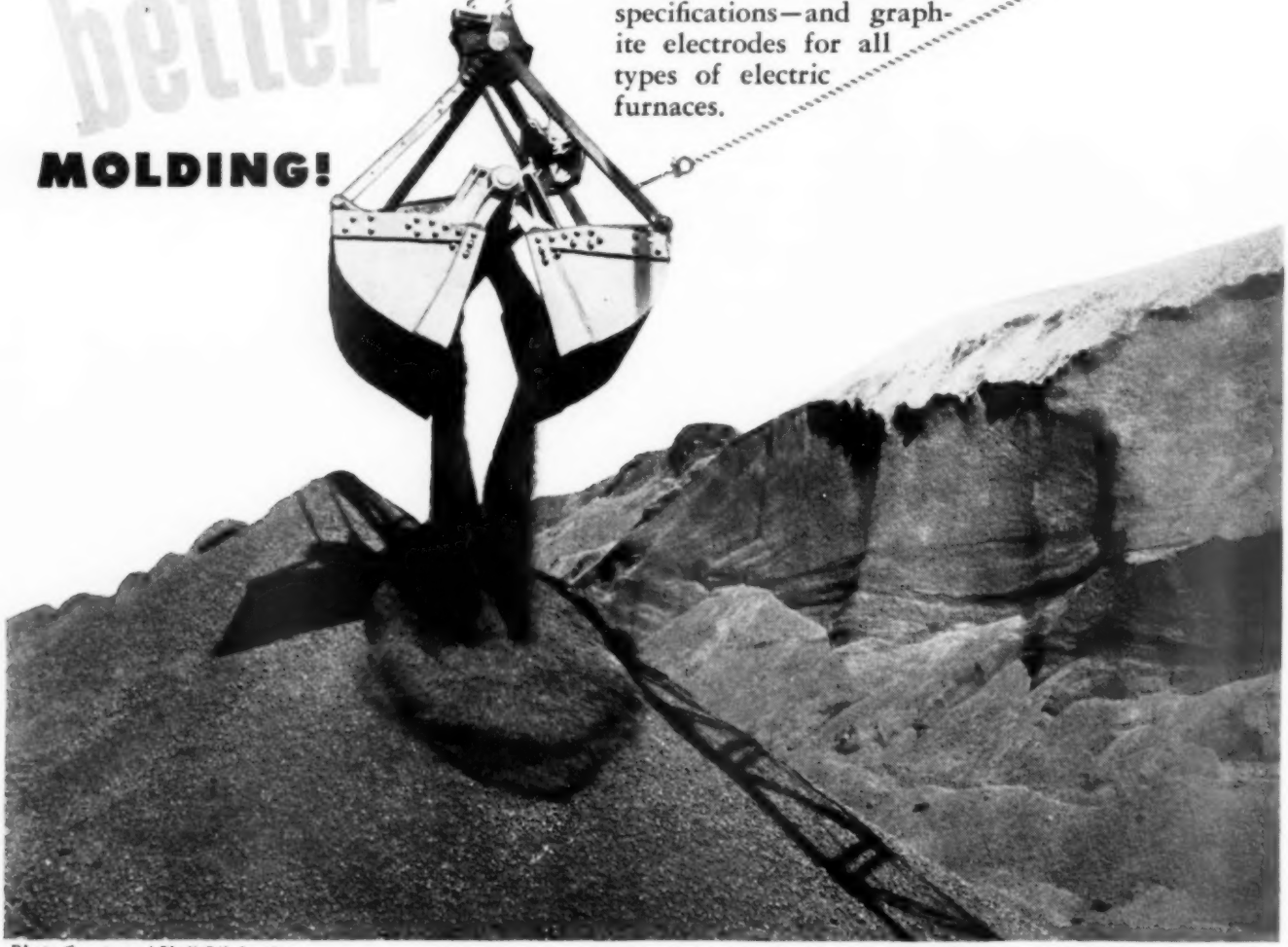
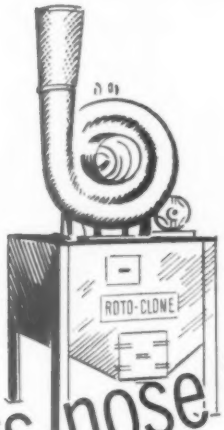


Photo Courtesy of Shell Oil Co., Inc.

3569

International Graphite & Electrode Corp.

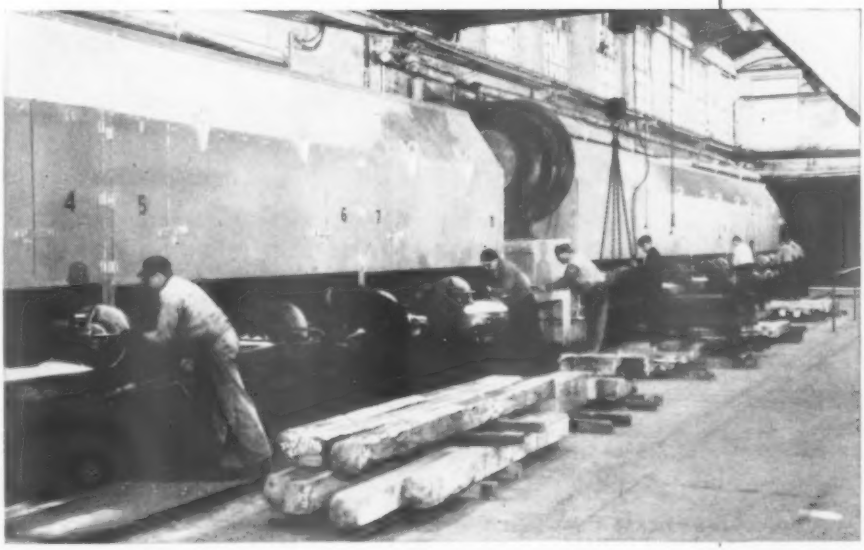
SAINT MARYS, PA.



It has its nose to the Nation's Grindstone

More Grinding Wheels are exhausted by the Type D Roto-Clone than any other make of dust collector

MAKE the rounds of industry. Check the dust collecting units serving the heavy duty grinding operations. You'll soon find the favorite. It's the Type D Roto-Clone.*



And here's why the Type D has worked its way into the No. 1 position. This high efficiency dynamic dust precipitator combines the functions of exhauster and dust separator in a single, compact, self-contained unit. One moving part—the impeller—draws in the dust laden air, separates the dust, delivers the collected material to storage hopper on which it is mounted and expels the clean air all in a single operation. The Type D is economical to operate, easy to install and can be located at or near dust source to eliminate long pipe runs.

You can install the Type D Roto-Clone as a central system or to serve a single dust producing operation. Precleaner attachment is supplied where chips, shavings and heavy concentration of abrasive dust are to be handled. For complete information ask your local AAF representative for copy of Bulletin No. 272 or write direct to . . :

**Roto-Clone is the trade-mark (Reg. U. S. Pat. Off.) of the American Air Filter Company, Inc., for various dust collectors of the dynamic precipitator and hydro-static precipitator types.*

AMERICAN AIR FILTER COMPANY, INC.

266 Central Avenue, Louisville 8, Kentucky

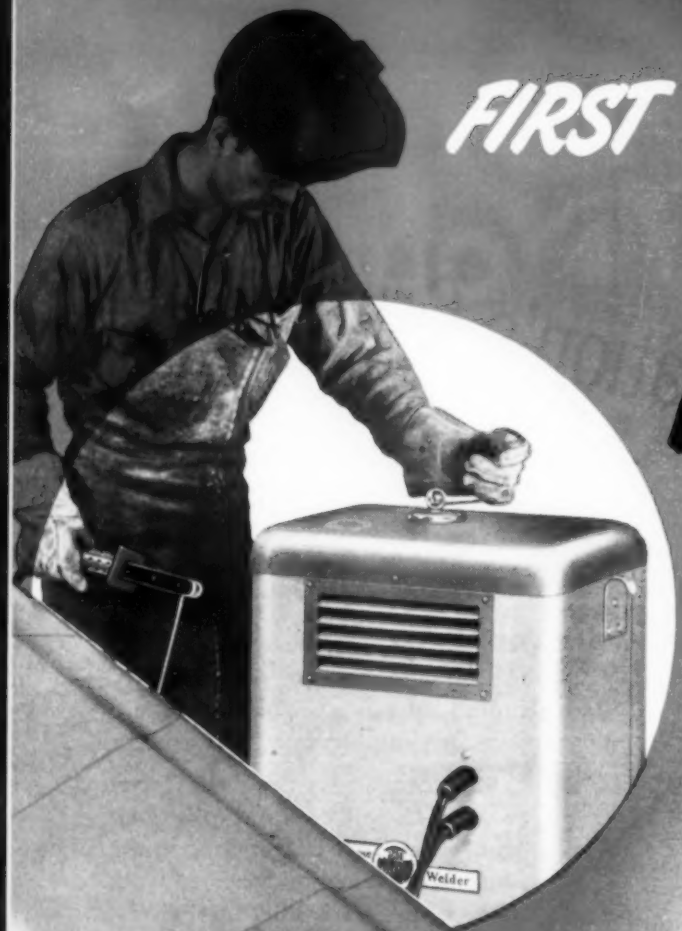
In Canada: Darling Bros. Ltd., Montreal, P. Q.

®AAF

ROTO-CLONE®
DUST CONTROL EQUIPMENT

FIRST FOR A-C WELDING!

WESTINGHOUSE



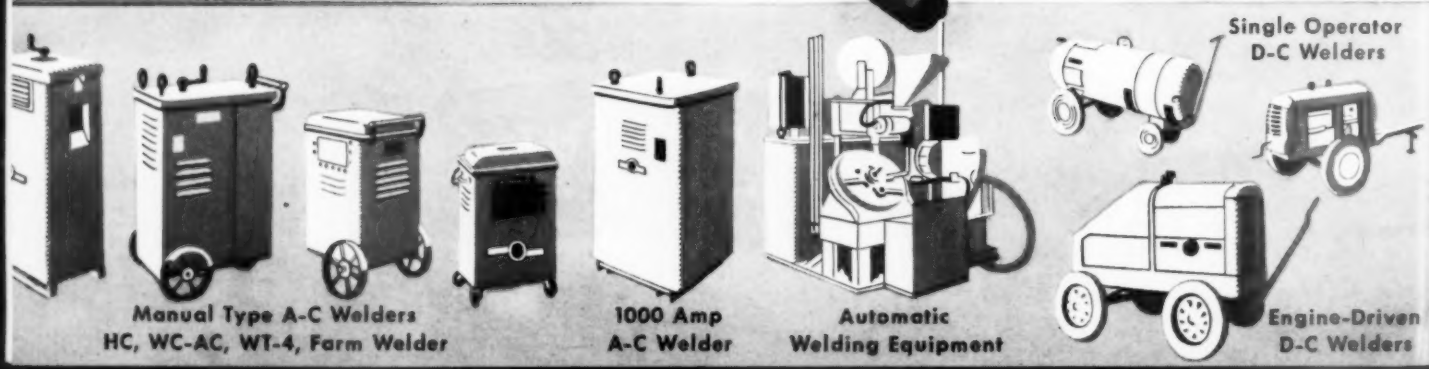
ACP ELECTRODES—class E-6010-11. For work not easily positioned, a-c and d-c reverse polarity.

DH ELECTRODES—class E-6020-30. For high-current, a-c or d-c, downhand welding.

FP ELECTRODES—class E-6012-13. For high-speed, general-purpose welding.

SW and SW-2—class E-6012-13. For low-current, all-position welding, light or heavy sections, a-c or d-c.

Also a complete line of Flexarc Electrodes for use with low alloys, cast iron, stainless steel and for hard surfacing.



FLEXARC ELECTRODES

If it's a-c welding of any type, you can be *sure* of results with Flexarc—the electrodes that first made a-c welding practical.

Developed originally by Westinghouse engineers for exacting Westinghouse manufacturing requirements, Flexarc SW and other electrodes have opened the way to today's widespread acceptance of a-c welding.

Together with Westinghouse developments in a-c welder design, they make a-c welding easy and economical to use.

Westinghouse Flexarc Electrodes work especially well with the new Westinghouse power-saving, low-voltage, "65"-type a-c welders. If you do not have full information on these newest developments in electrodes and welders, see your Westinghouse Distributor today, or write for details. They'll save you money . . . suggest new ways to cut costs. Westinghouse Electric Corporation, P. O. Box 2025, Buffalo 5, New York.

5 TO 20% MORE FOOTAGE WITH SW

Popular SW and SW-2 Flexarc Electrodes work easily, cut welding costs, give 5 to 20% more footage of weld. Fillets are full strength and *flat* without piled up *convexity* that wastes metal without adding strength. Photo shows 5/16" horizontal fillet weld, 10-3/4" long, made with one 1/4" x 18" SW-2 electrode with 2" stub end discarded. J-21416

A-C DOES IT FASTER, CHEAPER, BETTER 4 TIMES OUT OF 5!

FASTER: Ease in using heavier electrodes with higher currents, and the ability to make excellent welds in all positions assure higher speeds on all classes of work.

CHEAPER: "No-load" losses approximately 15% of d-c, pays for itself in power savings. 85% to 90% electrical efficiency as compared to 55% to 64% for d-c machines.

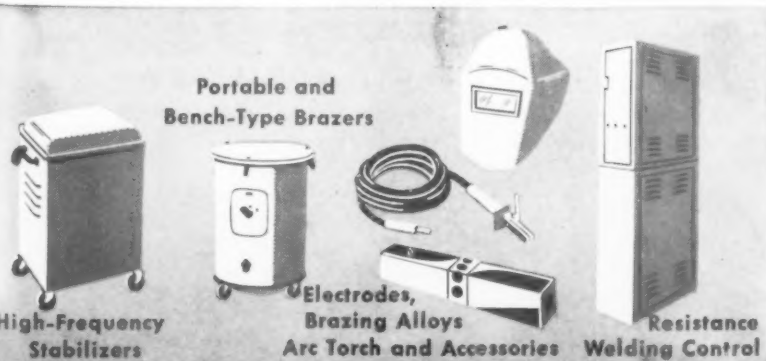
BETTER: Westinghouse A-C Welders eliminate magnetic arc blow—reduce spatter loss—permit welding of heavier sections—assure easy arc control and sounder welds.

Investigate Flexarc A-C Welders today—your Westinghouse representative can give you unbiased counsel on *any* metal-joining process.

Westinghouse

PLANTS IN 25 CITIES . . . OFFICES EVERYWHERE

EVERYTHING for Welding ANYTHING!



MAIL THIS COUPON

YES—send me details on the Westinghouse items checked.

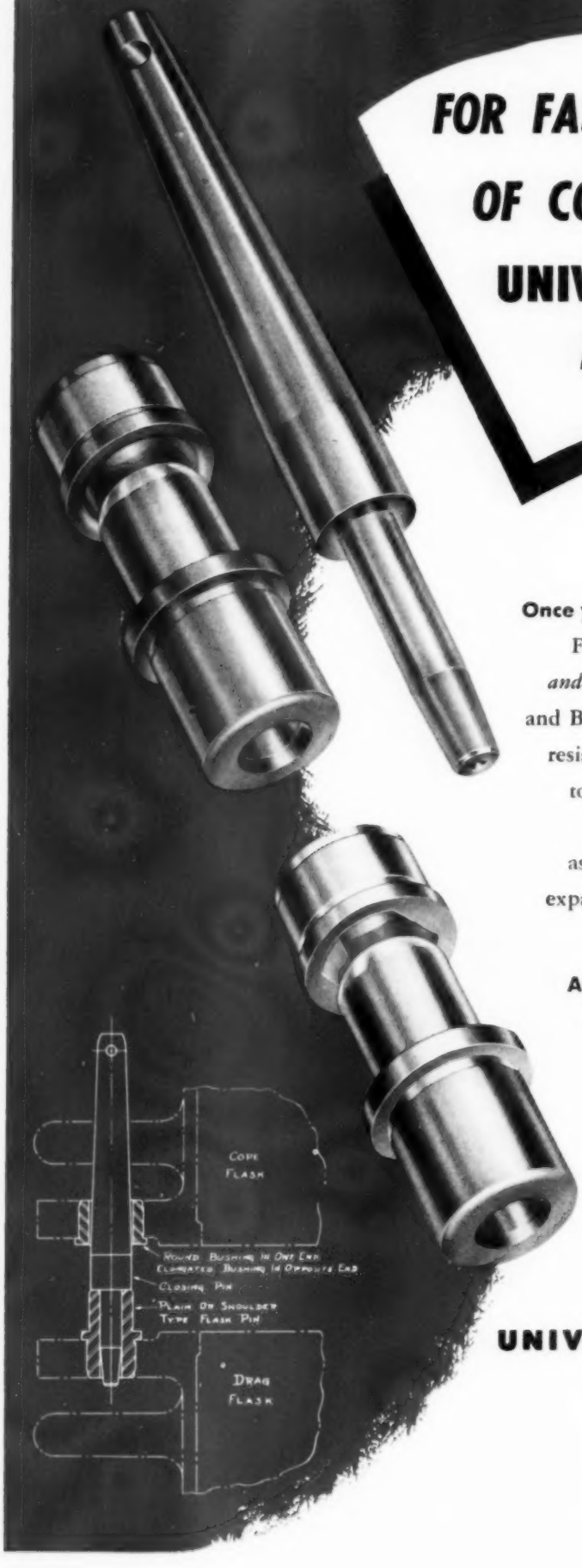
- ☐ Manual A-C Welders
- ☐ D-C Welders
- ☐ Multiple Operator Welders
- ☐ Engine-Driven Welder
- ☐ HF Stabilizers
- ☐ Brazers
- ☐ Electrodes
- ☐ Resistance Welding Control

Name _____

Company _____

Address _____

FOR FAST, ACCURATE LINE-UP OF COPE AND DRAG, USE UNIVERSAL FLASK PINS AND BUSHINGS



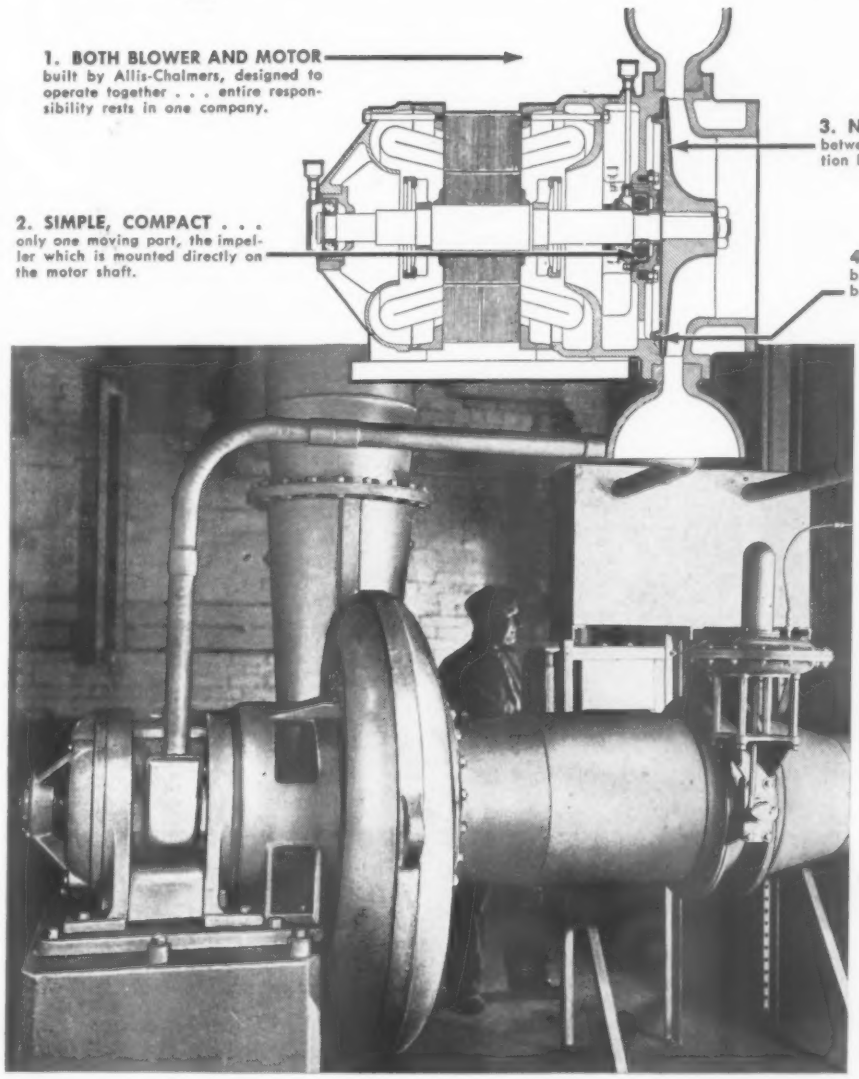
Once you install Universal precision made Standardized Flask Pins and Bushings *you can forget about cope and drag alignment troubles.* Universal Flask Pins and Bushings are hardened and ground for maximum resistance to wear. Cope Bushings are quickly guided to the Drag Pins over tapered, loose-fitting closing pins which are easily removed after assembly. Special design permits longitudinal expansion to compensate for metal heat, *without affecting accurate alignment.*

Available for immediate delivery in several sizes of round, elongated, press fit and taper types for use in cast iron, steel, aluminum, and magnesium flasks. *Special types and sizes to order.* Write for complete information.

UNIVERSAL ENGINEERING COMPANY

FRANKENMUTH 4, MICHIGAN

Specify Allis-Chalmers Cupola Blowers - *IT PAYS!*


1. BOTH BLOWER AND MOTOR built by Allis-Chalmers, designed to operate together . . . entire responsibility rests in one company.
2. SIMPLE, COMPACT . . . only one moving part, the impeller which is mounted directly on the motor shaft.
3. NO METAL TO METAL CONTACT between moving parts. Heavy, anti-friction bearings are the only wearing parts.
4. SEAL RING ON IMPELLER balances end thrust . . . reduces bearing loads to a minimum.

Foundrymen, Consultants:

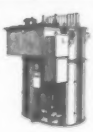
ONE OF THE BIGGEST FACTORS in overall cupola operating economy is the blower. That's why it's just sound business to have all the facts about all types of blowers before you go ahead.

For example: The design of *Allis-Chalmers* cupola blowers stems from over *60 continuous years* building high speed rotating equipment. Hundreds have been installed, and the very first units are still operating. Users say A-C blowers are easy to maintain . . . low in operating cost . . . that they have unusually long life.

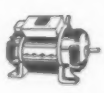
So compare *before* you buy, prove to yourself that "it pays to specify 'Allis-Chalmers'." ALLIS-CHALMERS, MILWAUKEE 1, WIS. A 2293

A-C BUILDS BASIC MACHINES, BLOWERS, PUMPS, DRIVES, ELECTRICAL EQUIPMENT FOR FOUNDRIES

ARC FURNACE transformers in any size for any furnace application. Five separate tap positions and a change from Delta to Wye connection give a wide range of voltages.



REGULEX* CONTROL for arc furnaces lowers and raises electrodes in response to rapidly changing conditions of the furnace charge. It makes possible lower cost melts, reduces electrode breakage.



COMPLETE LINE of motor controls for every requirement of motor operation. Manual or magnetic, reversing and non reversing, across the line or reduced voltage, single or multi-speed.

SEND FOR BULLETIN 07B6092A, "Foundry Mechanization" — It's packed with helpful, usable information on the *entire* Allis-Chalmers line of heavy foundry equipment.

*Allis-Chalmers Trademark

ALLIS·CHALMERS

One of the Big 3 in Electric Power Equipment — Biggest of All in Range of Industrial Products

A CENTURY OF SERVICE to Industry THAT MADE America Great

Foundry-Workers' Friend!

AO 1201 Hand Pad

This tough-duty hand pad is typical of AO's complete line of steel-stapled hand and finger guards. For handling rough stock in foundries, these products have long paid off in superior hand protection and wearing qualities.

The 1201 Hand Pad of chrome tanned cowhide has an open back and fully protected thumb. For added service, the leather palm patch is steel-stapled to palm.

AO Hand Guards in cowhide or asbestos are available for wear directly on the hand or over cotton or leather gloves—thus extending glove life. They never get in the way of the work—are light, comfortable, easy to put on and remove. Your nearest AO Safety Representative can supply you.

Safety Division of American Optical COMPANY

SOUTHBRIDGE, MASSACHUSETTS • BRANCHES IN PRINCIPAL CITIES

THE NEW THOR CHIPPERS ARE

BIG NEWS

IN AIR TOOLING

NEW streamlined design centers weight at the valve block . . . provides handling balance . . . puts weight *behind* the piston to absorb vibration and "kick-back."

No. 33
3" Stroke
Weight . . . 14½ lbs.
Length . . . 15⅜"

NEW plate valve block features large air ports that can deliver even at reduced air pressure full, constant power for faster . . . harder blows.

No. 22
2" Stroke
Weight . . . 13 lbs.
Length . . . 14¼"

NEW drop forged steel handle is shaped for comfortable hand grip, with ample clearance for large hands and gloves . . . eliminates cramping and operator fatigue.

No. 11
1" Stroke
Weight . . . 12 lbs.
Length . . . 12¾"

WRITE TODAY FOR INFORMATION OR CALL A THOR BRANCH FOR DEMONSTRATION

INDEPENDENT PNEUMATIC TOOL COMPANY
600 West Jackson Boulevard, Chicago 6, Illinois
Export Division: 330 W. 42nd Street, New York 18, N.Y.
Birmingham Boston Buffalo Cincinnati Cleveland Denver Detroit Houston Los Angeles Milwaukee New York Philadelphia
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Thor PORTABLE POWER TOOLS

PNEUMATIC TOOLS • UNIVERSAL AND HIGH FREQUENCY ELECTRIC TOOLS • MINING AND CONTRACTORS TOOLS

ANNOUNCING

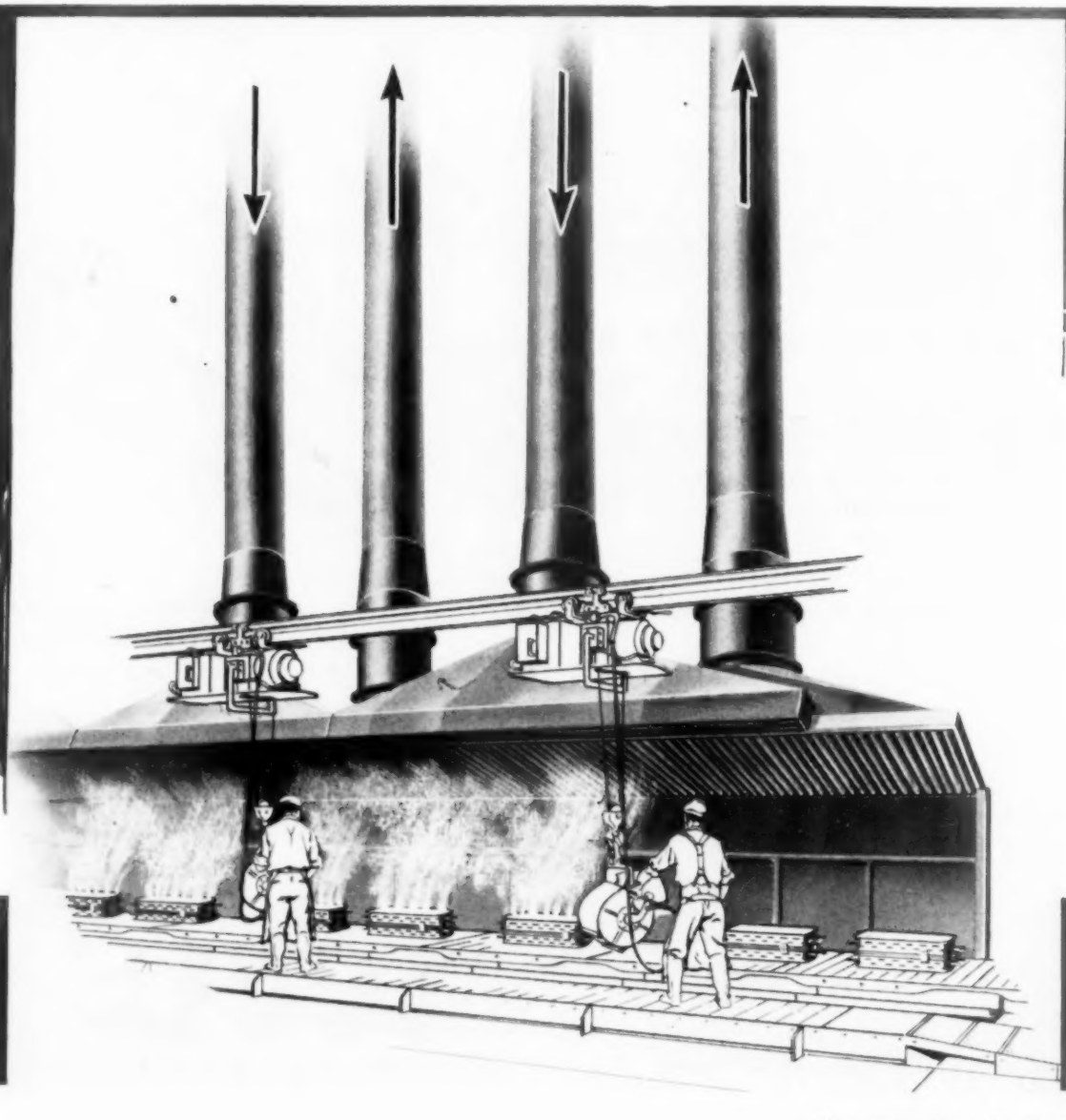
An important advancement in the field of Foundry Ventilation and Dust Control, as applied to exhaust from Shakeouts, Pouring Operations, Mold Cooling, Dump-Off Stations and Casting Cooling Conveyors.

The principle of introducing a "Compensating Air" Supply, located at exhaust hoods to provide the following important advantages:

1. Reduction in the amount of heat loss from the building in severe weather. During the winter months, the "Compensating Air" Supply is taken from outside the building and delivered through fans and ducts to ports adjacent to the exhaust hoods. This cuts to a minimum the volume of heated air removed from the building effecting considerable savings in fuel and power plant capacity.

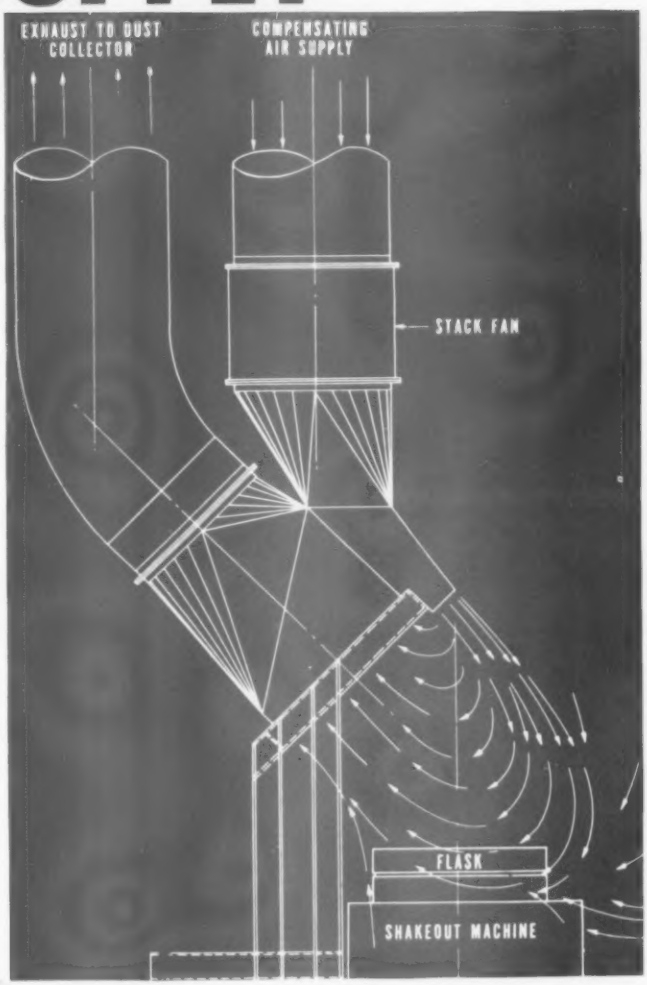
2. Improved ventilation is provided by directional control of air supply. The "Compensating Air" blankets the contaminated air, forcing it toward the exhaust hood. The air supply is directed so that it will NOT strike the workers.

3. During summer months "Compensating Air" is taken from high inside the foundry, rather than out of doors, and supplied to the exhaust hoods. This, in effect, scavenges the hot dead upper layer of air and pumps it out through the exhaust or dust collector systems. Thus building temperature is lowered and working conditions improved.



SCHNEIBLE COMPENSATING AIR SUPPLY

To lower your foundry ventilation and heating costs and at the same time improve working conditions, it will pay you to investigate Schneible Ventilating and Dust Collecting Systems, complete with the unique Schneible "Compensating Air" Supply System. (U.S. and Foreign Patents applied for)



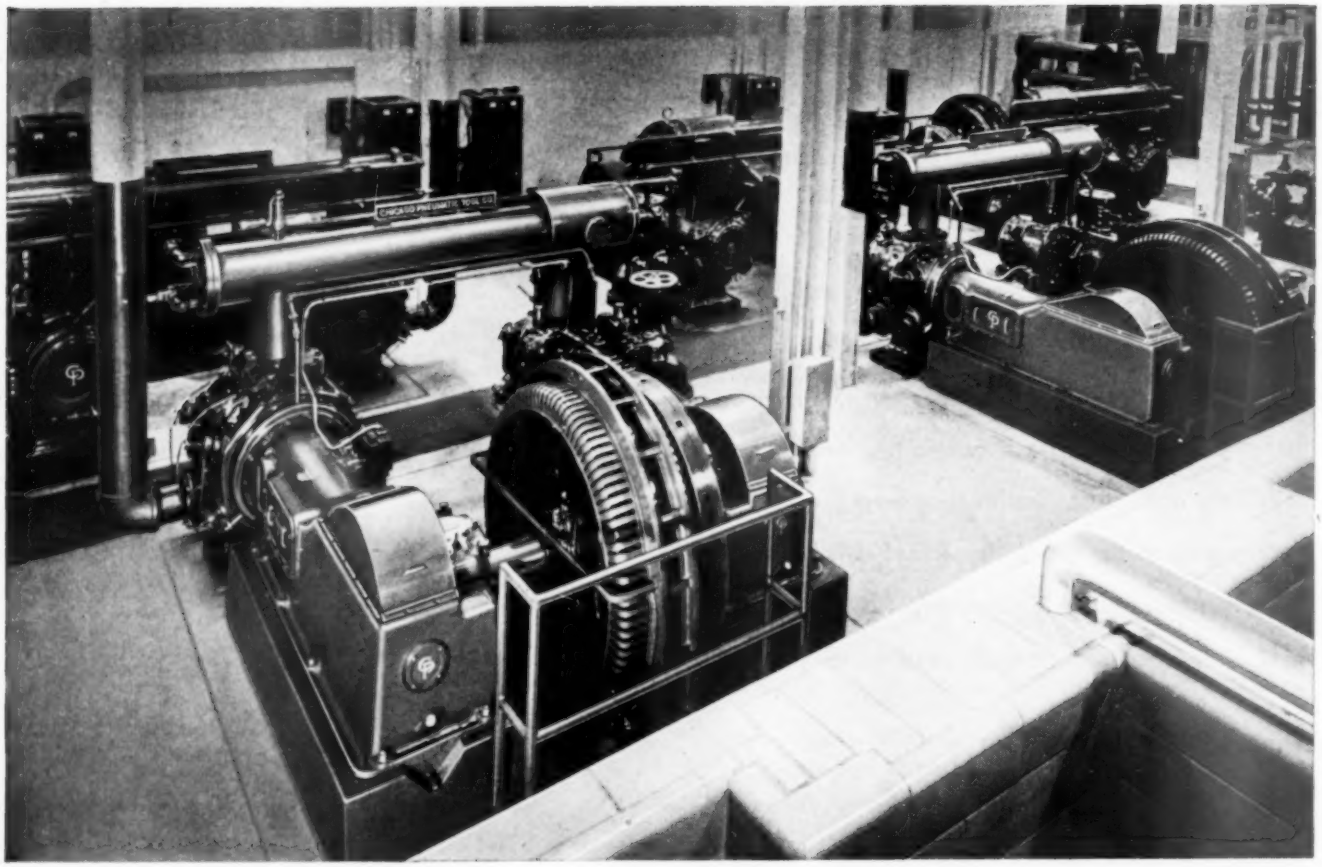
MANUFACTURER'S ASSOCIATION INC. FOUNDRY EQUIPMENT

CLAUDE B. SCHNEIBLE CO.
2827 Twenty-fifth St., Detroit 16, Michigan
Engineering Representatives in Principal Cities

Get the complete facts at our exhibit at the Foundry Show

SCHNEIBLE

LIQUID VAPOR INTIMATE CONTACT EQUIPMENT for DUST COLLECTION ABSORPTION CONDENSATION AND TEMPERATURE REDUCTION



for continuous heavy-duty and economical operation

O-CE Compressors

Rugged construction, conservative rating, and low power consumption make the CP motor-driven Class O-CE the ideal compressor for the continuous, heavy-duty job.

- Quick-acting Simplate valves minimize power consumption, and provide high volumetric efficiency.
- Large, streamlined air passages make air flow resistance negligible.
- CP Multi-step Control handles partial load demands with maximum economy.
- CP Intercooler assures maximum heat transfer with low water consumption.
- CP Automatic Starting Unloader completely unloads compressor when starting and stopping.

The CP Class O-CE Compressor is of the horizontal, double-acting, water-cooled type, with direct-mounted synchronous motor drive. Furnished in sizes up to 1,500 h.p., for pressures up to 5,000 pounds. Write for full information.

CHICAGO PNEUMATIC TOOL COMPANY

General Offices: 8 East 44th Street, New York 17, N. Y.

AIR COMPRESSORS • ELECTRIC TOOLS • PNEUMATIC TOOLS • DIESEL ENGINES
ROCK DRILLS • HYDRAULIC TOOLS • VACUUM PUMPS • AVIATION ACCESSORIES

Molded to Perfection

A WELCOME HANDSHAKE

AND PLENTY OF

FOUNDRY LIKE CHIT-CHAT

ARE AWAITING YOU AT

BOOTH 1210

52nd Annual Foundry

Congress and Foundry Show

Philadelphia

May 3—7, 1948

DROP IN AND WE'LL

SWAP VIEWPOINTS

Smith Core Oil

INDUSTRIAL OILS DIVISION

CORE WASH • ROD DIP • LIQUID PARTING

SMITH OIL & REFINING CO., ROCKFORD, ILLINOIS

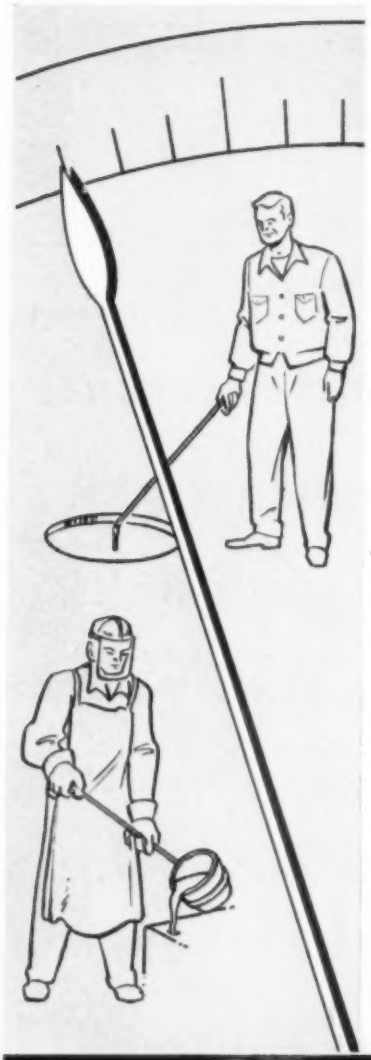
"25 DEGREES MAKES A BIG DIFFERENCE!"

"A difference of as little as 25 degrees off the desired temperature can mean the difference to us between sound and faulty castings. That is why we use the Marshall Thermocouple to take frequent molten metal temperature readings.

"For example, in melting aluminum in a tilting furnace, we find the temperature of the metal will often go up as much as 50 degrees after the furnace has been shut off. We overcome this by checking the metal for temperature again, after it has been fluxed, properly skimmed, and is all ready to pour. We are now getting sound castings of good color at every pour." (A Mid Western Foundry.)

To assure this close control of metal temperatures requires a top grade thermocouple—one that can be depended upon for accuracy. Marshall Thermocouples are built to give this accuracy, constantly and dependably.

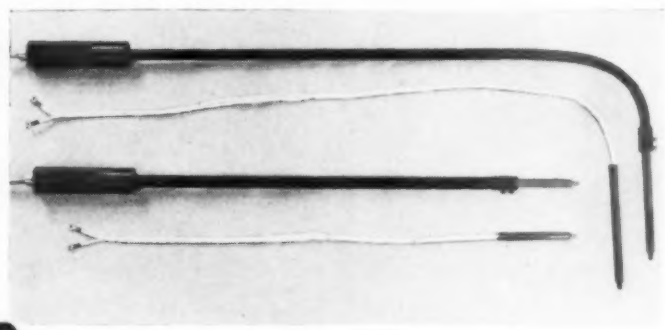
Features like the enclosed hot-junction tip, and insulation of the couple from contact with the extension tube, have made the Marshall thermocouple a favorite in every nonferrous foundry melting room. Write for descriptive literature. L. H. Marshall Co., 270 W. Lane Ave., Columbus 2, Ohio.



Marshall Thermocouples are made in two types: Furnace type, 50 inches long, and Ladle type, 35 inches long, overall.

Temperatures can be taken three inches below the surface of the molten nonferrous metal with Marshall Thermocouples. This three-inch immersion assures a true and accurate temperature report from the interior of the melt, and unhindered by the colder surface temperature.

Being protected from direct contact with the metal and slag, the hot-junction tip of the Marshall Thermocouple withstands repeated immersions.



MARSHALL
THERMOCOUPLES

THE STORY OF TITANIUM

GREECE HAD A WORD FOR IT

1 From the Titans of Greek mythology —symbolic of mighty strength — is derived the name "titanium," so designated in 1794 by the German chemist Klaproth. This scientist experienced unusual difficulty in isolating the new metallic element, since it is strongly held in its compounds.

NOT RARE BUT ABUNDANT

2 Not the rare element it is often thought to be, titanium is estimated as the tenth most abundant element in the earth's crust—more plentiful than chlorine, carbon, or sulphur. But the scarcity of concentrated deposits has been a handicap in recovering titanium from the oxides in which it is found.

JACK OF ALL TRADES

3 Useful for many purposes, titanium compounds find applications in the textile, leather, ceramic, and dental industries. Titanium dioxide is an excellent paint pigment. Titanium tetrachloride makes an effective smoke screen. Titanium is used as a deoxidizer in both ferrous and non-ferrous metallurgy.

ROAD TO SUCCESS

4 Reactivity with other elements is the key to the successful use of titanium in the steel industry. The affinity of titanium for oxygen, carbon, and nitrogen is a highly useful property in steelmaking. Titanium alloys are added to the ladle during the tapping operation as deoxidizers and cleansers.

FRIEND TO OIL MEN

5 The petroleum refining industry uses chrome steels for pipe lines and other equipment. Chrome steels containing titanium can be welded without subsequent heat treatment, for titanium prevents air-hardening. Properly made welds need not be annealed to maintain toughness.

For New Requirements

During the forty years of Electromet's experience in producing ferro-alloys, better alloys have continually been developed to meet the needs of steelmakers. Electromet now sells ferrotitanium in grades of 20 to 25 per cent, and 40 to 45 per cent titanium. In addition, aluminum-titanium, silicon-titanium, and manganese-nickel-titanium are available. To aid in the solution of metallurgical problems, Electromet's trained research and development staff is ready to be of service.

ELECTRO METALLURGICAL COMPANY

Unit of Union Carbide and Carbon Corporation

30 East 42nd Street UCC New York 17, N. Y.

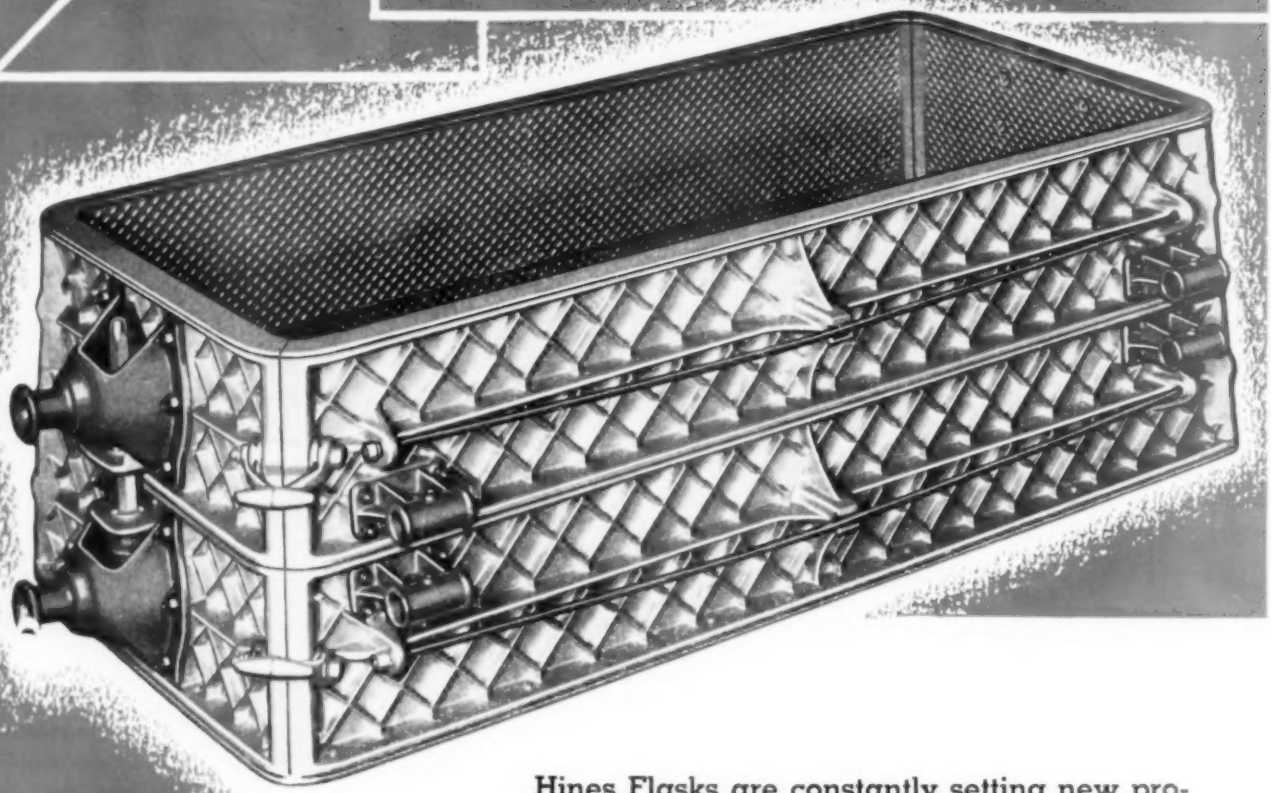
ELECTROMET Ferro-Alloys and Metals are sold by Electro Metallurgical Sales Corporation and Electro Metallurgical Company of Canada, Limited, Welland, Ontario.

Electromet

TRADE-MARK

Ferro-Alloys & Metals

Save and HINES FLASKS



Hines Flasks are constantly setting new production records—turning out more molds per day with less scrap. Production schedules are easily met when Hines Flask Equipment is used.

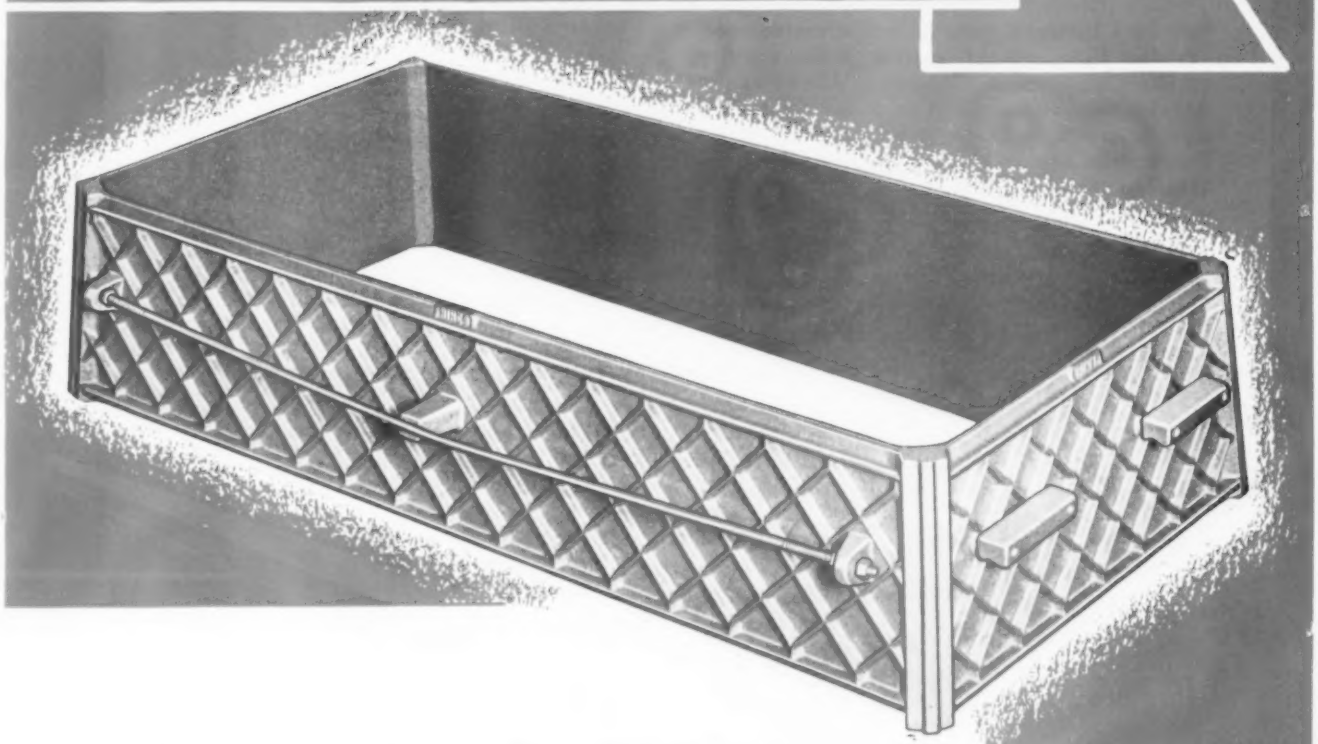
HINES POP-OFF (Trademark Reg. U. S. Pat. Off.) FLASK

All Hines Flasks and Jackets are fully protected by U. S. and foreign patents and patents pending.

THE HINES

3431 WEST 140th ST.

be Safe WITH AND JACKETS!



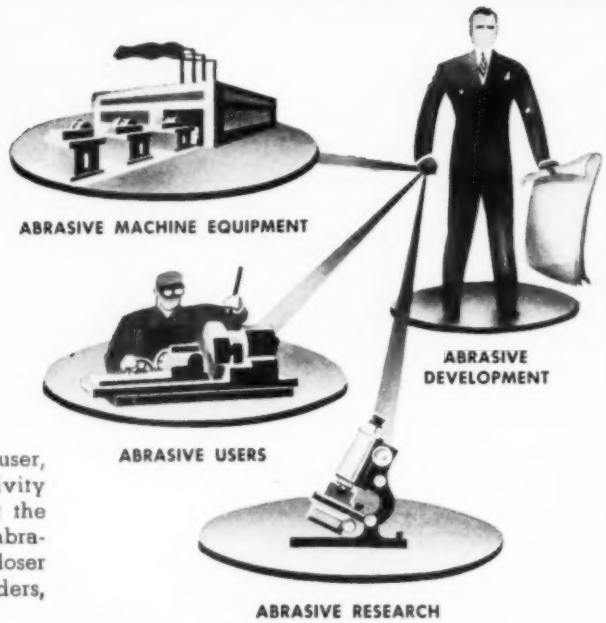
Hines jackets, either aluminum or cast iron, fit the molds perfectly when used in connection with Hines flasks. Right now, aluminum jackets are more popular than iron. They cost less and the deliveries are much better, due to recent Government Pig Iron Regulations.

S FLASK CO.

CLEVELAND 11, OHIO

A BUYING GUIDE FOR ABRASIVES

ABRASIVE PROBLEM:
Is there a better abrasive or technique for the job?



ANSWER BY
CARBORUNDUM
TRADE MARK

Key step between research and abrasive user, "Product Development" is an important activity at The Carborundum Company. Aimed at the development and application of the right abrasive in the right place, it brings about closer cooperation among abrasive machine builders, abrasive users, and our own research.

Products and techniques are rigidly tested and evaluated for both grinding wheels and coated abrasives. Suggestions are investigated and analyzed. Vital information is collected and interchanged. Facts and figures are checked and correlated. The net result is realized in more effective selection and application of abrasives ... another reason for preferring products by CARBORUNDUM. The Carborundum Company, Niagara Falls, New York.

A Good Rule for Good Grinding ... CALL IN

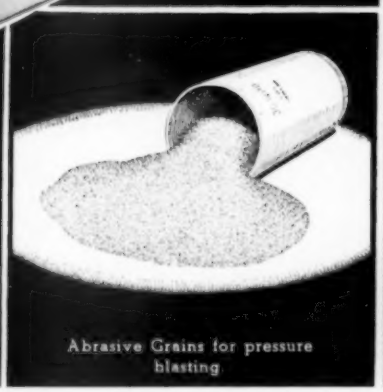
CARBORUNDUM
TRADE MARK

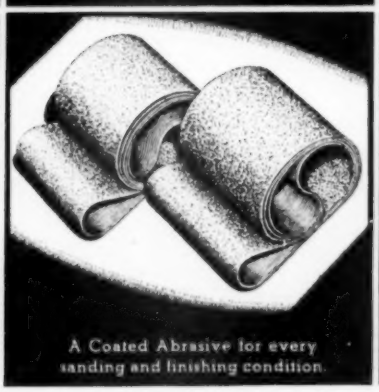
- BONDED ABRASIVES
- COATED ABRASIVES
- ABRASIVE GRAINS AND FINISHING COMPOUNDS

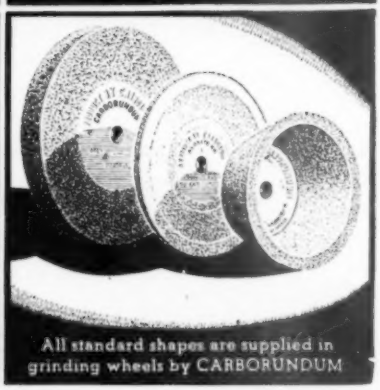
Tool Room sticks and stones that cut fast ... last long ... and hold their form.

A variety of rolls for a wide range of uses.

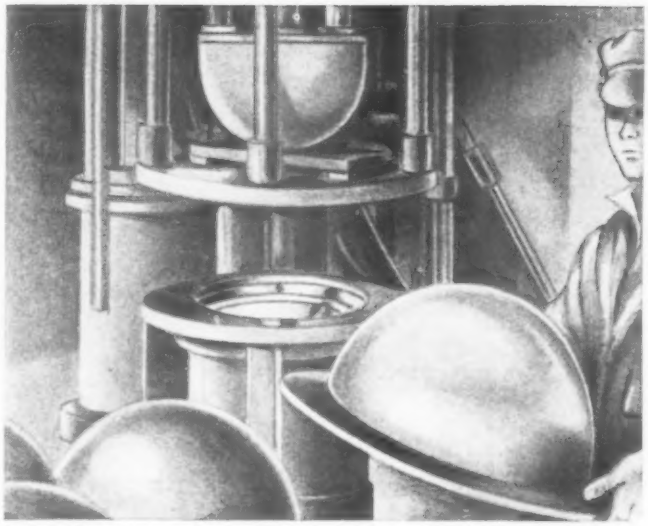
"Carborundum" is a registered trademark which indicates manufacture by The Carborundum Company.


Abrasive Grains for pressure blasting.


A Coated Abrasive for every sanding and finishing condition.


All standard shapes are supplied in grinding wheels by CARBORUNDUM

High Temperature Lubrication... 400° F. and UP!



A fabricator of hot-drawn magnesium parts says, "At temperatures of 550°F. no oil retains its lubricating properties. Even grease is unsatisfactory. **"dag"** colloidal graphite is vastly superior and in our plant is exclusively used for this purpose."

For deep-drawing, casting, extruding, and other high temperature operations requiring lubrication **"dag"** colloidal graphite has unique properties about which you should know. Check the coupon; we're glad to help! Acheson Colloids Corporation, Port Huron, Michigan; Boston; New York; Philadelphia; Pittsburgh; Cleveland; Detroit; Chicago; St. Louis; Los Angeles; San Francisco; Toronto.

dag COLLOIDS
REG. U.S. PAT. OFF.

We are interested in:

- ☐ Extreme (high or low) temperature lubrication
- ☐ General lubrication
- ☐ Parting
- ☐ Opaquing
- ☐ Impregnation
- ☐ Electronic applications

DD14

40th Anniversary Year

ACHESON COLLOIDS CORPORATION, Port Huron, Michigan

the source

Crude abrasive is produced by our Canadian plant . . . refined, tested, processed in our Philadelphia factory . . . then used in manufacture of grinding wheels second to none in quality, performance and cost-cutting efficiency.

the products

Complete line includes Grinding Wheels, Mounted Wheels and Points, Segments, Abrasive Grain, Bricks and Sticks . . . known, proven products backed by Simonds Abrasive Company's reputation as a major manufacturer of grinding wheels and abrasives for over 50 years.

Borolon — ALUMINUM OXIDE

Electroon — SILICON CARBIDE

SIMONDS ABRASIVE CO.

PHILADELPHIA, PA.

Grinding Wheels

Complete line includes every shape and size.

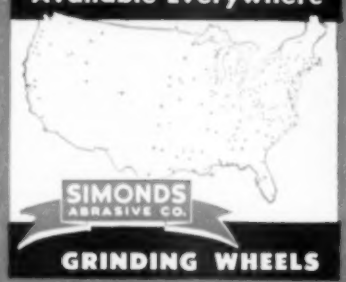
Abrasive Grains

Mounted Wheels and Points

Surfacing Segments

Bricks and Sticks

Available Everywhere



where to get them

From your Simonds Abrasive Company distributor member of our distributor network serving key industrial centers here and abroad. He stocks Simonds Abrasive grinding wheels for every job and can advise you on wheel selection. Let us send you the name of the distributor in your area. Write now.

SIMONDS ABRASIVE CO.
Philadelphia, Pa.
Electric Furnace Plant, Simonds Canada Abrasive Co., Ltd., Arvida, P.Q.

SIMONDS ABRASIVE COMPANY
is a division of
SIMONDS SAW AND STEEL CO.
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Lockport, N.Y.
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SIMONDS CANADA SAW CO. LTD.
Montreal, Can.
Simonds Products for Canada

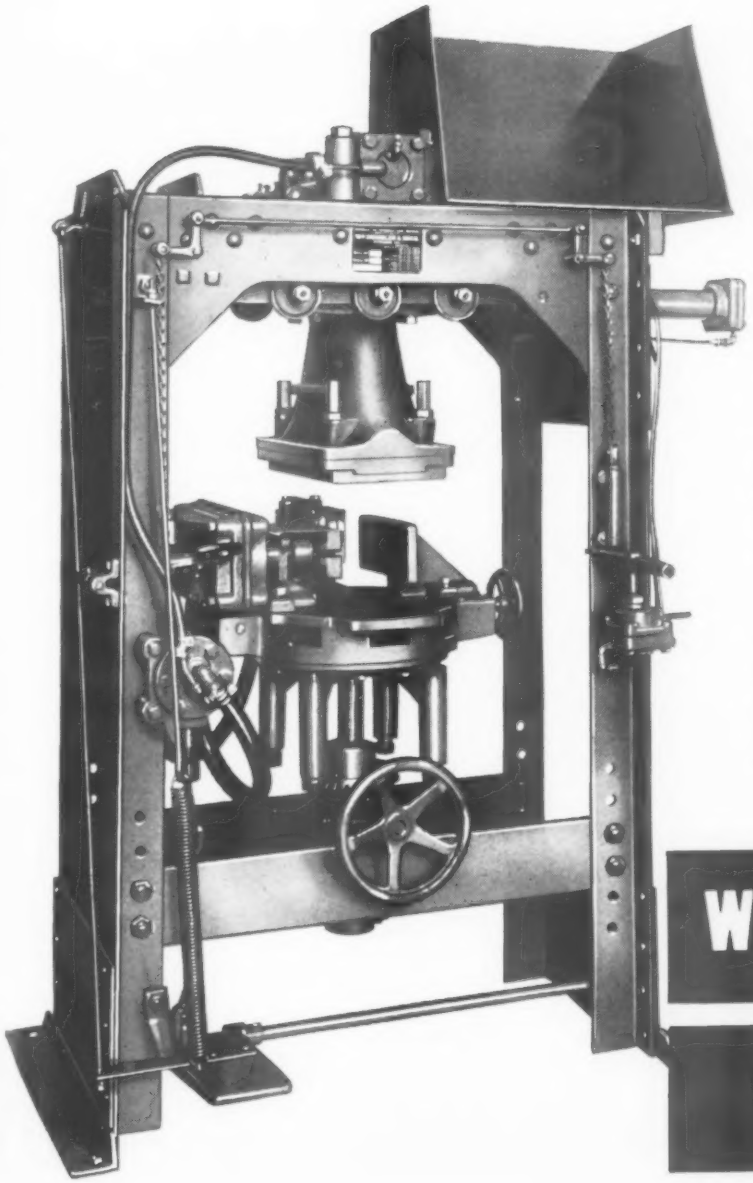
Whether you use portable, swing frame or floor stand grinders, Simonds Abrasive Company Grinding Wheels provide long lasting action, definite economy, over-all dependability on every job. It costs you nothing to consult a Simonds Abrasive Company engineer on your grinding problems. He can probably show you where you can save money through use of Simonds Abrasive Company Grinding Wheels adapted to particular conditions of your jobs.

SIMONDS ABRASIVE COMPANY, PHILADELPHIA 37, PA. • DISTRIBUTORS IN ALL PRINCIPAL CITIES

VERSATILE!

The No. 1 Demmler

General Purpose Core Blowing Machine



The DEMMLER No. 1 general purpose Core Blower is a popular machine because it is a profitable machine to own.

Its versatility in blowing both small and medium size quality cores at a high rate of speed with maximum economy, coupled with its modest price and rugged dependability, has made it the leader in its field.

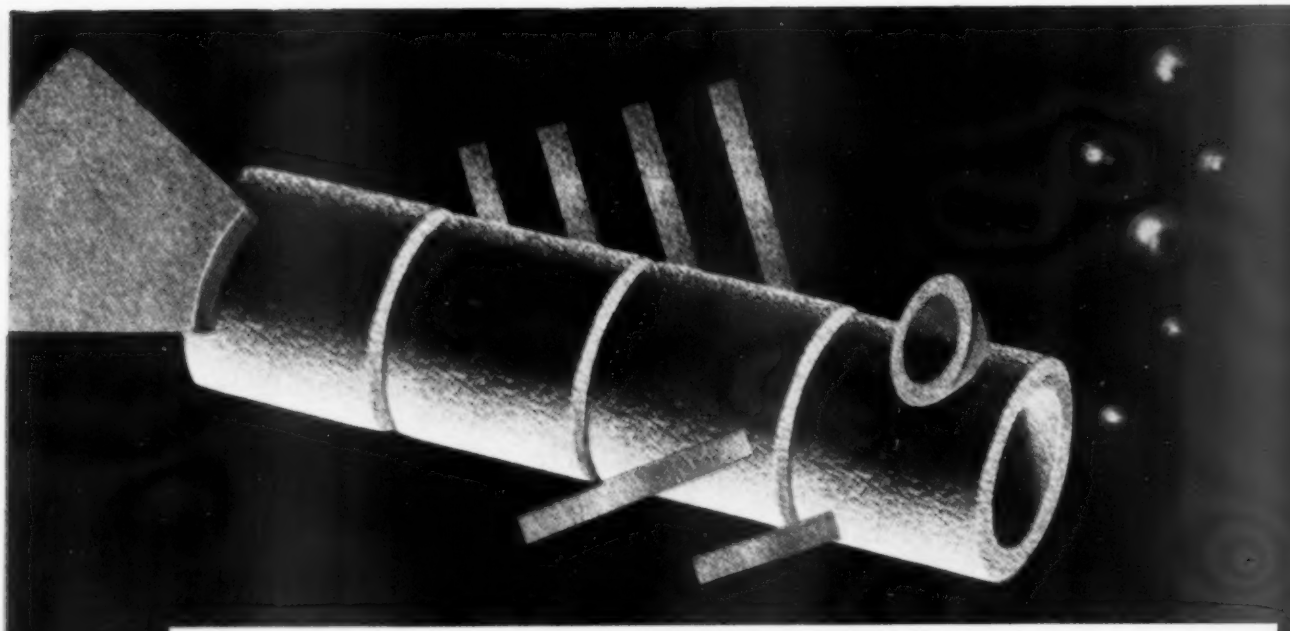
The machine is built on a rugged structural steel frame, has a productive capacity of about 200 core boxes per hour and is available with several different sizes of sand magazines. Job changes in from five to ten minutes are easy because hand wheels quickly raise and lower the chuck table and make the proper chuck jaw adjustments. The clamping, blowing and releasing operations are performed in less than four seconds.

For general-purpose small and medium core blowing work, choose the DEMMLER No. 1—the core blower with an unchallenged reputation for dependable, profitable performance.

WRITE FOR ILLUSTRATED FOLDER TODAY!

Wm. Demmler & Bros.

KEWANEE, ILLINOIS



Want to reel in lower grinding costs?

Are you fishing for ways to cut overhead or improve production in your grinding department?

Are wheel wear, dressing time and expense, wheel loading or slow stock removal eating into your profits?

Then Peninsular engineers can help you. Let them give your grinding a complete check up, *at no cost to you.*

They'll make a thorough study of your machines, your grinding methods, the materials you grind. Only after this exhaustive analysis has been made will they make their suggestions and recommendations.

This Peninsular on-the-grounds analysis is the chief reason Peninsular *custom-made* wheels have helped bring in savings for manufacturers in almost every industry during the last sixty years.

May we have one of our engineers call on you?

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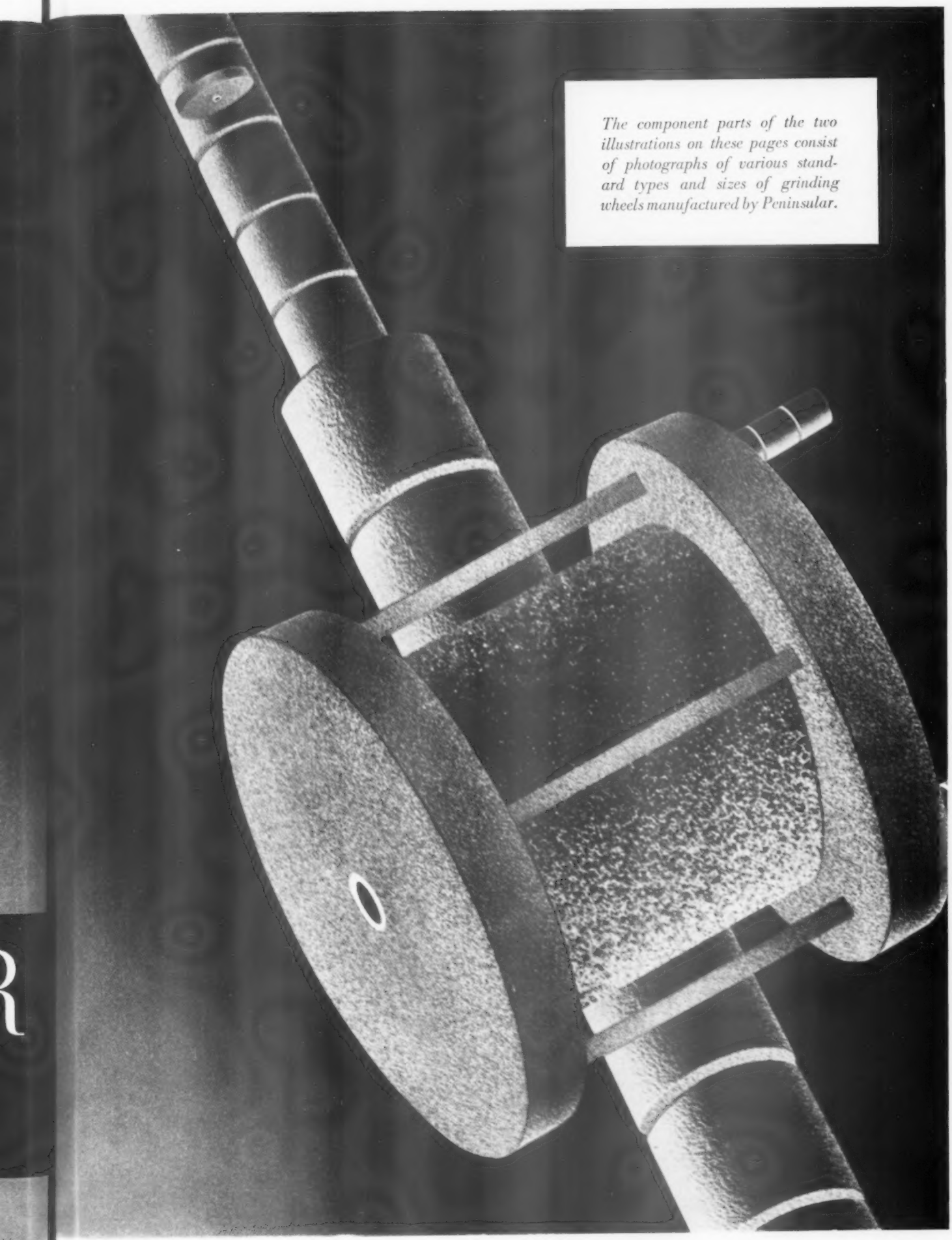
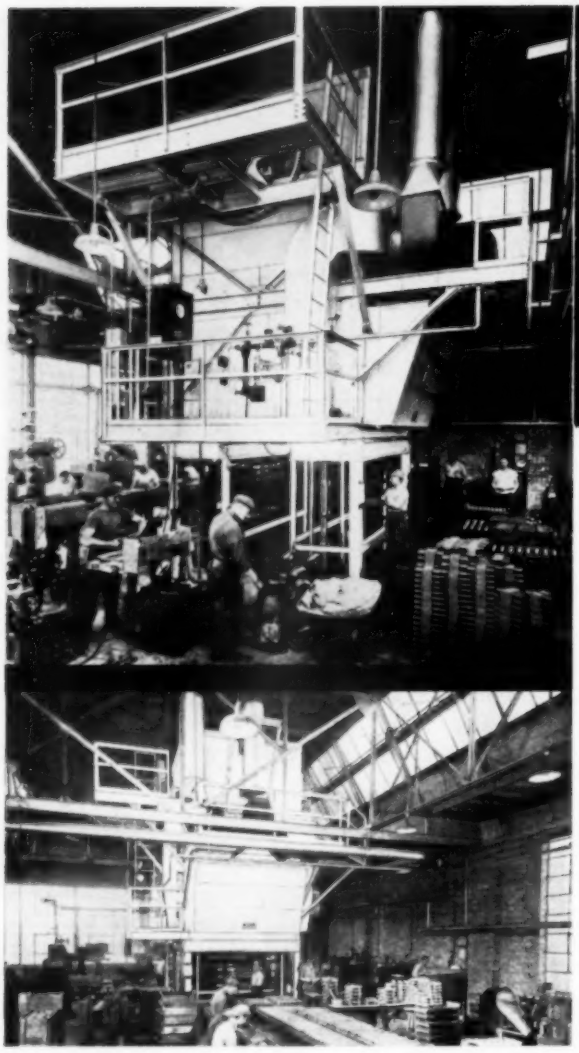


The component parts of the two illustrations on these pages consist of photographs of various standard types and sizes of grinding wheels manufactured by Peninsular.



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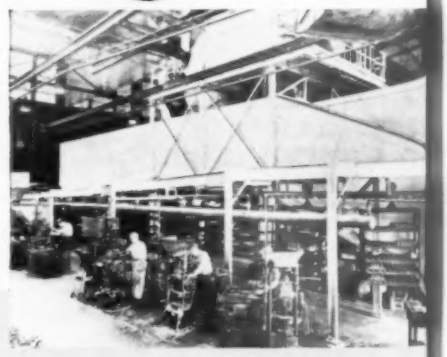

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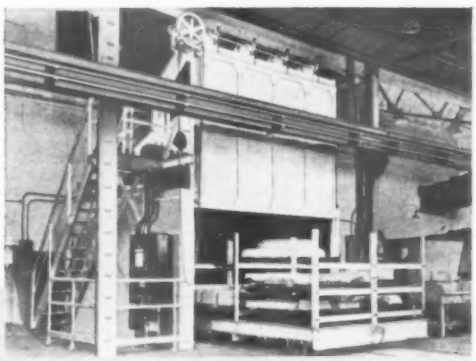

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Chapters Can Further Use of Technical Data

GROWTH of the chapter movement under auspices of the American Foundrymen's Association has been phenomenal. Since the first chapter was established in 1934 by a forward looking group of Chicago foundry operators and equipment and supply vendors, the desire to start chapters has been quite spontaneous. Today, the association has thirty-eight regular and four student chapters functioning in the United States, Canada and Mexico. Judging from the number of new chapters that have been organized in recent years, and by the continued interest maintained by older chapters, the ultimate in AFA chapter activities has not been reached.

Chapters have exerted a marked influence upon technical and operating men of the castings industry. Because a few leaders in various districts were interested in a better industry, and were willing to devote time and effort in selling the chapter idea, many more foundrymen today are participating in a program dedicated to the production of better castings. Chapters have provided the driving force which has brought AFA membership to an all-time high. For the first time in the 52-year history of that famous organization, membership exceeds 10,000, with a high percentage affiliated with chapters.

But the task of chapters surely extends beyond the mere gathering of more members. In fact, the greatly expanded membership presents a tremendous challenge to both chapters and the AFA.

Perhaps the three most important functions of the chapter rest in the field of social, educational and technical developments. There can be no doubt that chapters have been most successful in breaking down many of the barriers that had developed among foundrymen in so many sections of the country. Men now are meeting with their contemporaries and are working together for the common good. The work of various chapters in selling the community on the value and importance of the foundry industry, in interesting young men in selecting the production of castings as a career, and in furthering foundry education, is constantly in evidence.

But some chapters do not seem to utilize all potentials of the technical program. As the number of chapters increases, the problem of securing able speakers grows in proportion. So much depends upon the judgment and persuasive abilities of program committee chairmen. Geography also is a factor.

Work of many AFA committees produces much valuable information which is not being employed as extensively as it should be by individual operators in solving everyday production problems. If a way could be found to assure greater use of the reservoirs of information available through AFA, the foundry industry should be in a better position to meet future competition. Perhaps chapter programs offer the mechanism for greater dissemination and utilization of these data.

Frank G. Steinebach

Editor

Solidification Mechanism of Tin

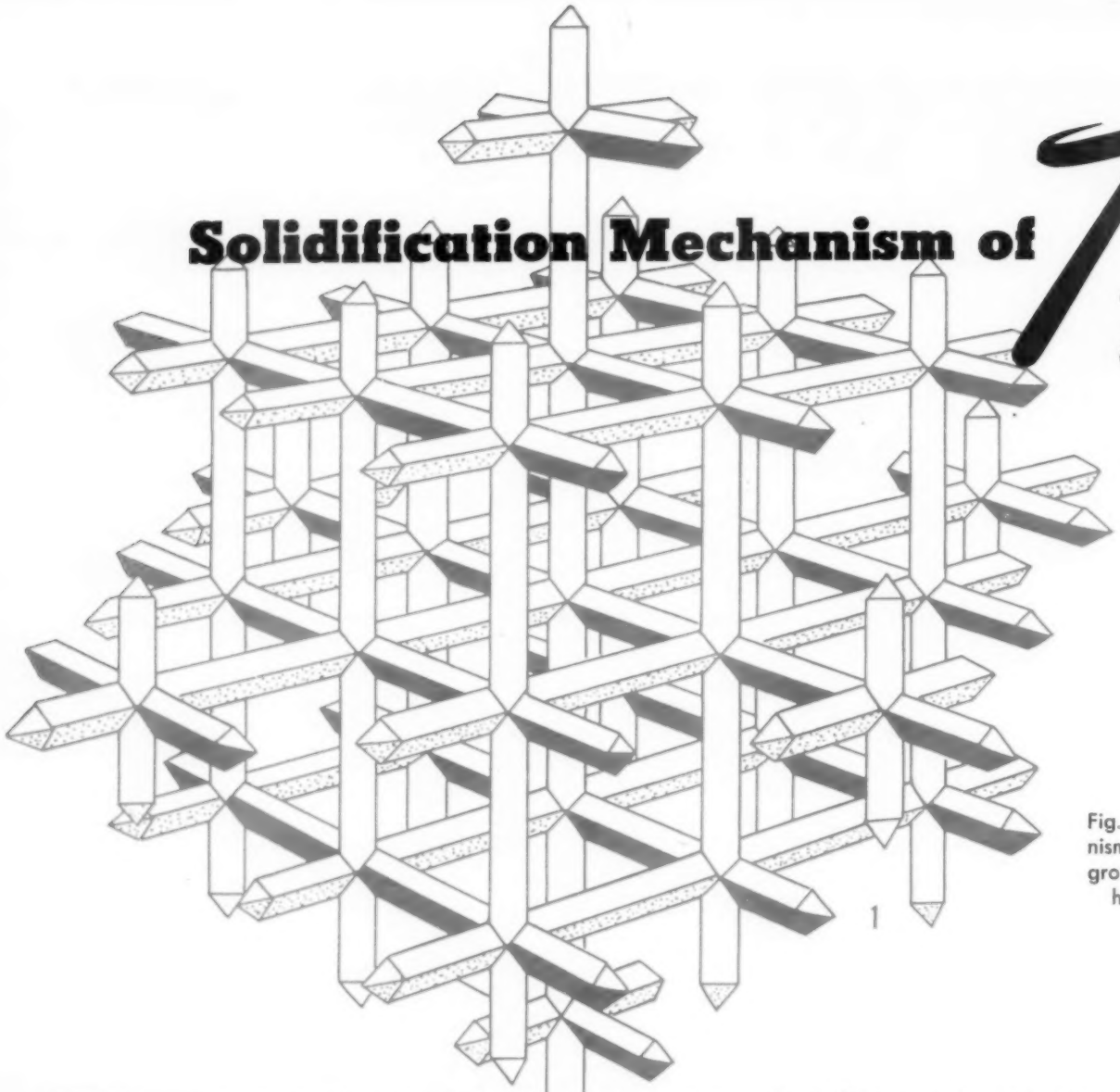

Fig. 1 — Mechanism of axial growth in a tetrahedral grain

TIN bronzes compose what is probably the oldest series of copper-base alloys known to man, first having been made accidentally by the reduction of naturally occurring ores which contained the correct combination of metallic compounds. Because of their comparative ease of smelting, the simplicity of forming by casting or by hot or cold forging, and because of their excellent physical properties and resistance to wear and corrosion, the tin bronzes might be considered as the earliest and the most widely used of the industrial alloys.

Because of this combination of strength, ductility, hardness, and resistance to ordinary forms of corrosion, these alloys have come into rather general use for a number of industrial purposes, among the oldest of which might be mentioned bell metal, gun metal, statuary and coinage. Theoretically, the term "bronze" includes only those alloys made up of copper hardened by the addition of varying proportions of tin, and should be distinguished definitely from the brasses which are chiefly alloys of copper and zinc.

At present the term "tin bronze" is used to define those copper-base alloys containing 2 to 20 per cent of tin, with zinc less than tin, and with lead less than 0.5 per cent. Because of certain specific properties and similar response to variables in foundry technique, other alloys can be included in the present discussion. These alloys include the leaded tin bronzes and the high-leaded tin bronzes, all of which are similar to the tin bronzes except that the lead contents are considerably higher. In the same category can also be included some of the red brasses and leaded red brasses, such as 85-5-5-5 alloy, which contain a considerable amount of tin, and the zinc content of which may be only slightly above that of the tin.

There is some indication that the tin bronze series began with alloys having the approximate composition of 90 per cent Cu and 10 per cent Sn, although the early alloys probably were contaminated with other elements which, in certain cases, may have enhanced the properties. Whether or not this is the case, a thorough study of the 90-10 alloy will give a good basis on which to predict the properties of other combinations and the effect of additional alloying elements upon these properties. For instance, the addition of small amounts of phosphorus to this alloy produces an exceptionally hard and wear resisting bronze which is especially useful for heavy duty bearings. Again, the substitution of 2 per cent Zn for an equal amount of copper produces an alloy with somewhat greater strength and which is quite a

Bronzes

By CLYDE L. FREAR
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Bureau of Ships, U.S. Navy
Washington

This is the first of two articles discussing the mechanism of solidification in producing tin bronzes. The author welcomes criticism of his paper, in the hope of obtaining ideas for further research and development

bit easier to cast. This so-called 88-10-2 alloy has long been a standard composition, known chiefly as gun metal, although a number of the gun metals may vary somewhat from this exact combination of constituents, to meet certain industrial needs or because of the presence of certain impurities.

As has been mentioned, the presence of zinc up to a certain maximum, which is usually less than the tin content, imparts hardness and strength to the alloy, and usually tends to increase the soundness of the casting, making it less subject to gas holes and reducing the tendency to shrinkage porosity. Probably its chief disadvantage lies in the fact that its presence increases the tendency to galling under heavy frictional pressures. For bearings which must withstand heavy pressures, the zinc should be low or absent altogether.

Lead has almost the opposite effect to that of zinc, in that it lowers the strength and ductility, but imparts excellent bearing qualities to the metal. It also improves the machinability to a considerable extent. Added to a copper-tin-zinc alloy, it will reduce the tendency to galling. Another advantage, especially in the case of castings which must withstand pressures, is that, if lead is present in amounts greater than the limit of solid solubility, the free lead which separates upon solidification will tend to fill in and seal areas of internal porosity. This property, in addition to the excellent machinability, is probably the main reason for the use of the 85-5-5-5 alloy for low and medium pressure valves and fittings. Metallurgically speaking, this might be considered as a rather poor excuse for the addition of lead, but commercially it is an excellent and economical method of accomplishing the desired results. Because of the excellent antifrictional properties imparted by lead, this element is often added in amounts even greater than 25 per cent.

Nickel has come to be a rather important alloying element in the production of tin bronzes, especially during the shortage of tin during World War II. Nickel gives improved strength, helps to eliminate porosity, often serves well with high-lead bronzes to impart needed strength and to aid in the uniform dispersion of the lead in the bronze matrix. On the other hand, nickel has a considerable effect upon reducing the resistance of the bronze to moving salt water, especially if the tin content has been reduced upon the introduction of the nickel. With certain types of melting equipment, the presence of nickel tends to increase the difficulties due to gas absorption.

Although used in very small amounts, and usually as a deoxidizer, phosphorus, because of its profound effect upon the strength of the bronzes, must be considered as an alloying agent. This element, in amounts as low as 0.01 per cent, tends to increase both the strength and the ductility, probably because of the removal of oxygen which would produce a coarse grain structure and gas porosity. Above 0.03 per cent it evidently becomes an alloying element, increasing the tensile and compressive strengths but rendering the alloys more brittle.

It is not surprising that, with all the possible alloying elements available, each having its particular effect upon the properties of the alloy, there are large numbers of bronze compositions on the market today. In most cases these alloys have been developed for specific purposes.

Because of the outstanding properties exhibited by the bronzes, the word itself has been broadened to cover other copper-base alloys having superior strength and related physical properties such as obtain with aluminum bronze which contains little or no tin, and manganese bronze, which is a yellow brass hardened by small additions of manganese. However, by the term "bronze" in this article, the author means the true copper-tin bronzes to which may be added the permissible lesser amounts of other alloying elements, and which may contain the usual permissible impurities. Most of the discussion will be based on gun metal conforming to Navy Depart-

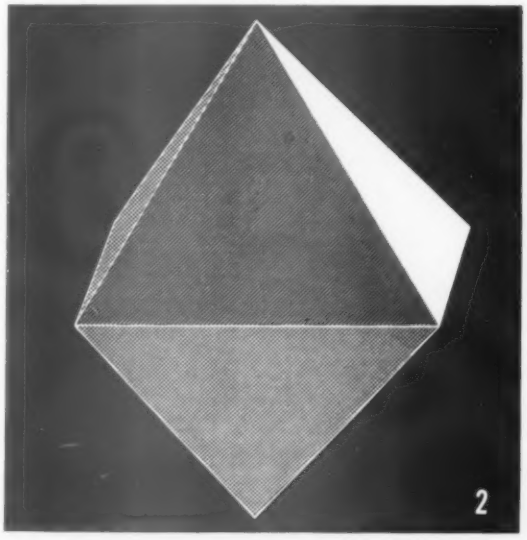


Fig. 2—Tetrahedral grain resulting from growth mechanism shown in Fig. 1

ment specification 46-M-6, but will apply equally well to the 90-10 or the 88-10-2 alloy. It is felt that if sound castings can be produced from these alloys, little or no difficulty should be experienced with any of the tin bronzes, including the red brasses and the lead bearing bronzes.

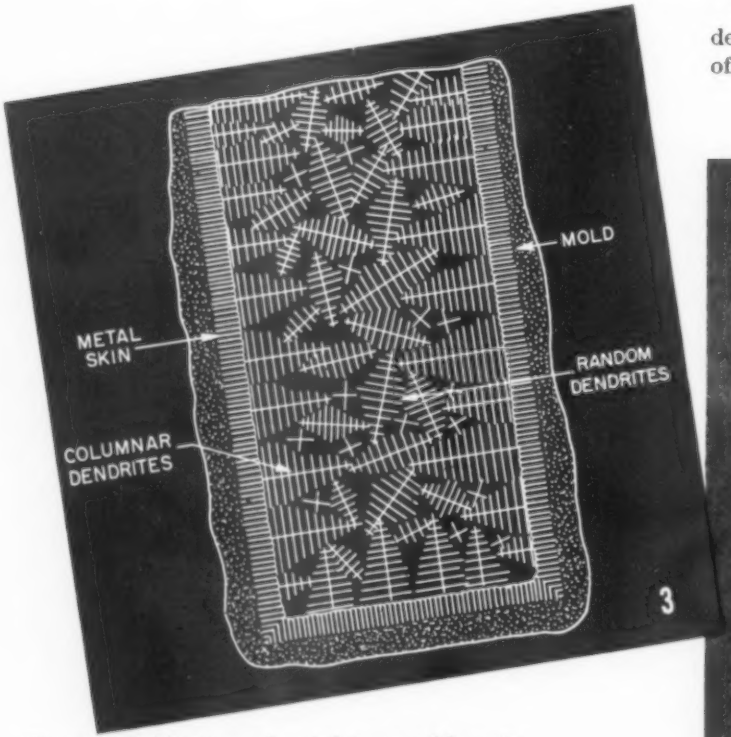
The reader should be informed that certain of the explanations to follow are the opinions of the author, based upon the results of his work in a number of foundries, and the technique used in eliminating or preventing the occurrence of defects. In some of the explanations presented, there is no absolute proof at the present time that these opinions are correct, or that they express the only answer. Most of them, however, coincide with the published opinions of authorities and are believed to point in the right direction.

As mentioned earlier, the tin bronzes are outstanding in the nonferrous field where resistance to salt water and other common corroding mediums is required, especially when these solutions are in motion, thus adding erosive effects to those of corrosion. If the tin content is above 5 per cent, these alloys have a tendency to form a hard, strong and impermeable coating resembling an enameled surface which is very resistant to further reaction with the corrosion medium. When the tin content is below 5 per cent, this film either fails to form or is easily dissolved and washed away, exposing the underlying metal to continued corrosive effects. For years tests have been conducted in an attempt to develop a bronze or other easily castable alloy which would have all the advantages of the tin bronzes without the concurrent difficulty usually encountered in the foundry in producing castings capable of withstanding high pressures, especially if one or both of the cast surfaces have to be removed by machining. To date none of these tests has proved to be successful.

The type of defect which is the chief cause of leakage in bronze castings is what is commonly known as interdendritic shrinkage, intergranular shrinkage, shrinkage porosity, overall porosity, microshrinkage, microporosity and by other terms often much more expressive. As the other types of defects can be eliminated by the judicious use of known foundry principles and usually by simple changes in the design or foundry technique, it is intended to limit this article to a discussion of this interdendritic shrinkage, an attempt to explain its cause, and to advance methods of combating the difficulties caused by its presence.

When interdendritic shrinkage is present, there can be found a measurable reduction in the density of the solid metal which is indicative of the presence of voids. By compressing cubes of bronze and then determining the density, Hessel[1] measured voids in excess of 6 per cent. These voids usually can be shown by a radiograph of the affected section. If the shrinkage is heavy, the individual discontinuities may be seen on the radiograph, but in most cases the presence of the interdendritic shrinkage will be indicated only by an undefined darker area on the film at the areas of lesser density. In some cases the voids are sufficiently small that it is difficult to find them under the microscope even though they may be large enough and in sufficient numbers to cause severe leakage under comparatively low pressures.

The simplest method and probably the surest to determine the presence and the extent of this type of shrinkage is by fracturing the casting. On the



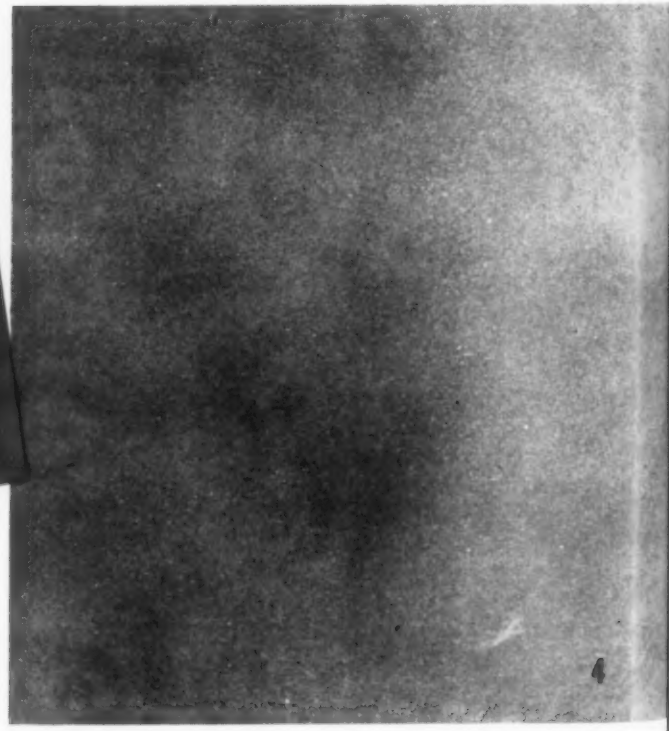


Fig. 3—Solidification of metal in a mold cavity
Fig. 4—Radiograph showing small amount of interdendritic shrinkage at middle of a gun metal plate
Fig. 5—Extremely bad case of interdendritic shrinkage

fresh fracture the shrinkage will become evident usually by a discoloration of the surface. This discoloration may range from a lemon yellow through various shades of orange, red, brown and blue, and in cases of especially heavy shrinkage, the fracture may have an appearance similar to that of rotted wood. Regardless of the color, the presence or absence of shrinkage may be determined by examining the fracture under a low-power microscope. If shrinkage is present, the fracture will contain distinct dendrites. If shrinkage is absent, the fracture will be finely granular, with no traces of dendrites, and will have a yellowish gray color with a bluish tinge as distinguished from the yellow color of a freshly machined or ground surface.

Fig. 4 is a radiograph showing only a small amount of interdendritic shrinkage at the middle of a gun metal plate. It will be noted that this shrinkage is indicated by a shadowed effect rather than by the appearance of individual voids. This radiograph should be compared with that shown in Fig. 5 which indicates an extremely bad case of interdendritic shrinkage.

Another indication of the formation of these voids in the tin bronzes is the fact that there is little "drawing down" of risers when the metal solidifies in the mold. This lack of feeding has given rise to a somewhat general belief that bronzes require only small risers in order to feed the castings; the fallacy of this can be proved by a simple bit of reasoning. Most of the copper-base alloys, monel metal and steel draw down in the risers, producing a deep, narrow pipe. These piping metals are usually free from interdendritic shrinkage. Judging from the comparative absence of riser shrinkage, one might conclude the bronzes have little or no liquid to solid shrinkage.

It has been proved, however, that the solidifying shrinkage of the tin bronzes is at least as great, and in some cases greater than that of the metals having normal, deep piping type of riser contraction. What, then becomes of this shrinkage? In the absence of massive shrinkage or draws, the lack of feeding can only be explained by the dissemination of small shrinkage voids throughout the casting, which may be missed entirely by the usual methods of inspection, but will usually be found when later the casting has been delivered, machined and subjected to pressure tests.

This particular type of defect is sufficiently general to give rise to the belief that it is an inherent property of all copper-tin alloys, increasing in amount as the tin increases. Every once in a while, however, nearly everyone has produced a heat of tin bronze which has drawn down in the risers and pouring gates as any well behaved metal should. The author has seen such heats dismissed as errors in melting; the actual fact, however, is that these heats were probably the only really normal ones produced. The single fact that bronzes are sometimes produced which have normal feeding properties should be sufficient incentive to determine, if possible, just why risers do not ordinarily feed bronze castings and why this particular type of shrinkage, which is the cause of most of the leakers, is obtained. Once the exact cause is learned the complete elimination of such shrinkage should be a rather simple matter.

Cause of Porosity on Tin Bronzes

Micrographic and microradiographic studies indicate the porosity of tin bronzes is the result of microscopic voids lying between the dendrites or between the dendritic branches of the metal after it has solidified. The wide liquidus-solidus range (approximately 260° F) of these alloys, as shown by the copper-tin equilibrium diagram, has often been stated as the cause of this "inherent" tendency to interdendritic shrinkage, especially as the corresponding range in copper-zinc alloys, which exhibit normal shrinkage tendencies, is somewhat less than 100° F.

But what about the aluminum-copper alloys which have a freezing range approximately the same as the copper-zinc alloys, yet often show interdendritic shrinkage; and the iron-carbon alloys as represented by some white irons which exhibit normal shrinkage tendencies, yet have almost double the freezing range of the copper-tin alloys? It seems apparent, therefore, that we must look elsewhere for an answer without, however, completely overlooking the freezing range which probably has an indirect effect upon the phenomonen.

Dendritic Growth—All metals solidify by a mechanism known as dendritic growth which is illustrated by Fig. 1. In the case shown, solidification begins at a point at the exact center of the figure where the three longest axes cross, and proceeds along these three axes in perfectly straight lines. Along each axis, and at some certain distance from the starting point, secondary axes are thrown off, just as branches grow out from the trunk of a tree. Growth continues along these secondary axes the same as along the main (*Please turn to page* 124)

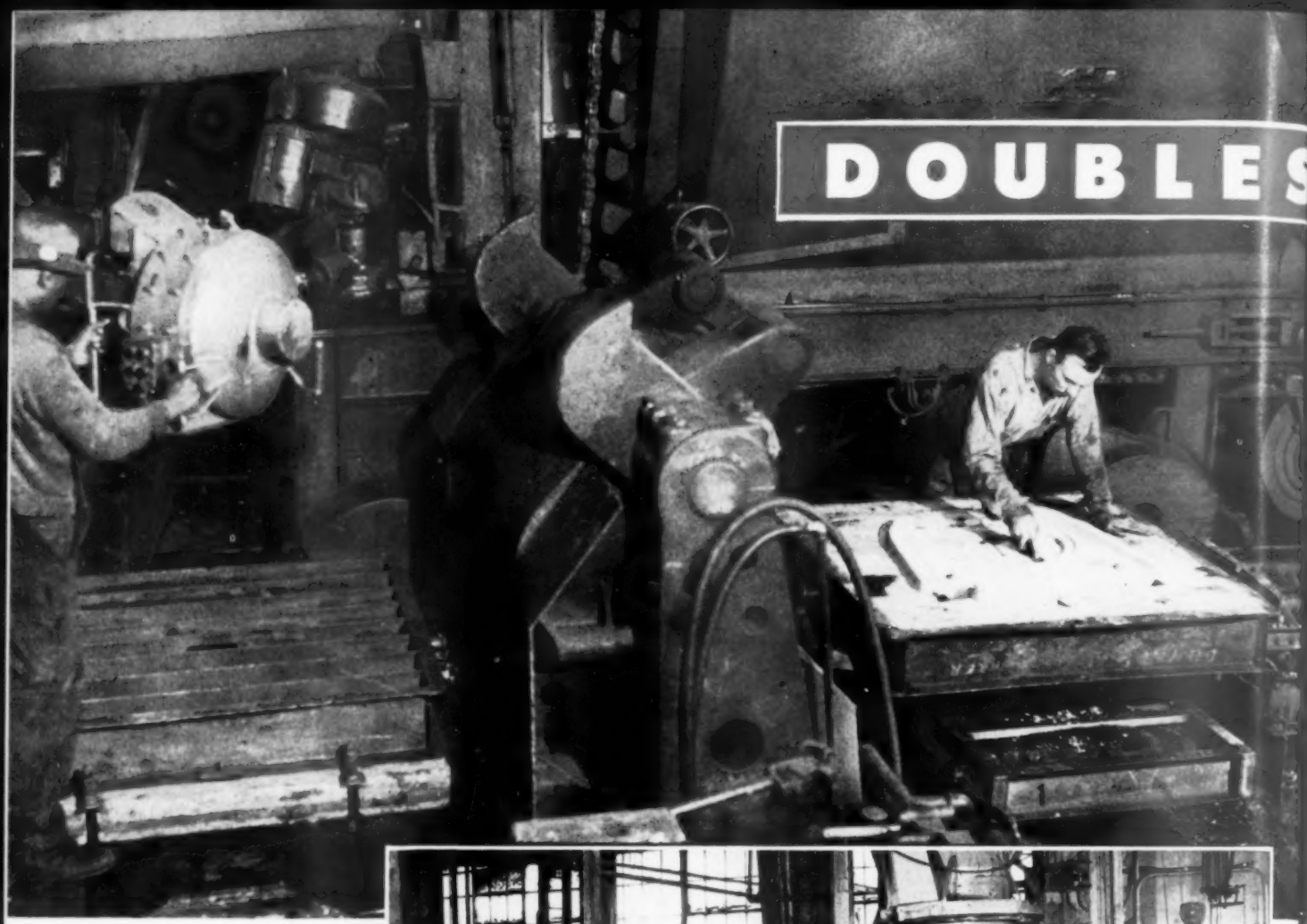


Fig. 1 — Rollover machine and motive type sandslinger handle molds for larger castings required in quantities

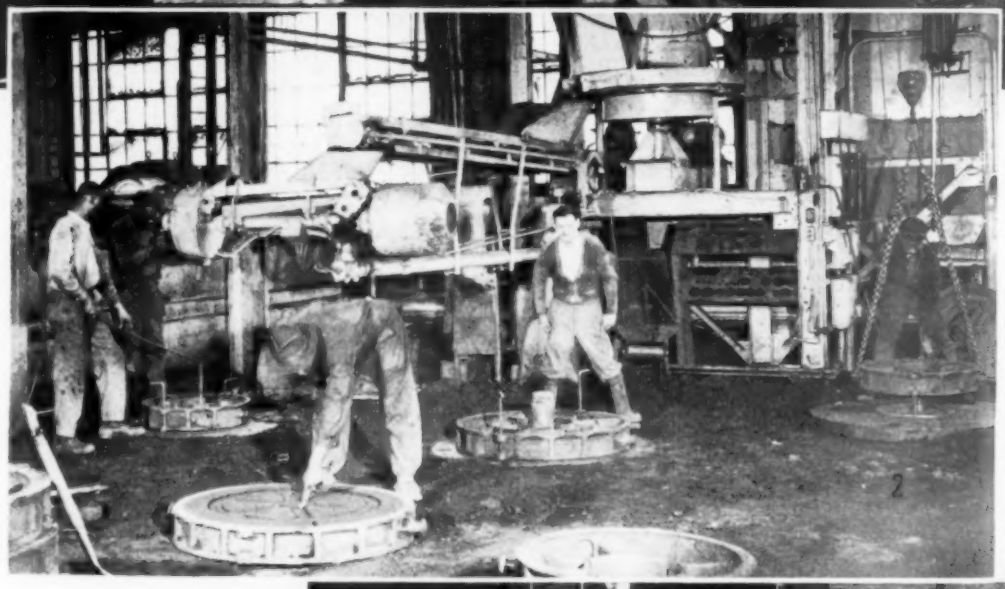


Fig. 2 — Patterns for molding sprockets are fixed on three stationary plates on the floor. Molds are stripped by a hoist

Fig. 3—Illustrating the variety of castings produced by Olney Foundry

Fig. 4—Three jolt rollover machines are used in conjunction with pin stripper units to mold medium size castings

Fig. 5—Larger castings on which individual runs are small are molded on the floor

By WILLIAM G. GUDE
Managing Editor
THE FOUNDRY

Foundry Capacity

With Same Floor Area

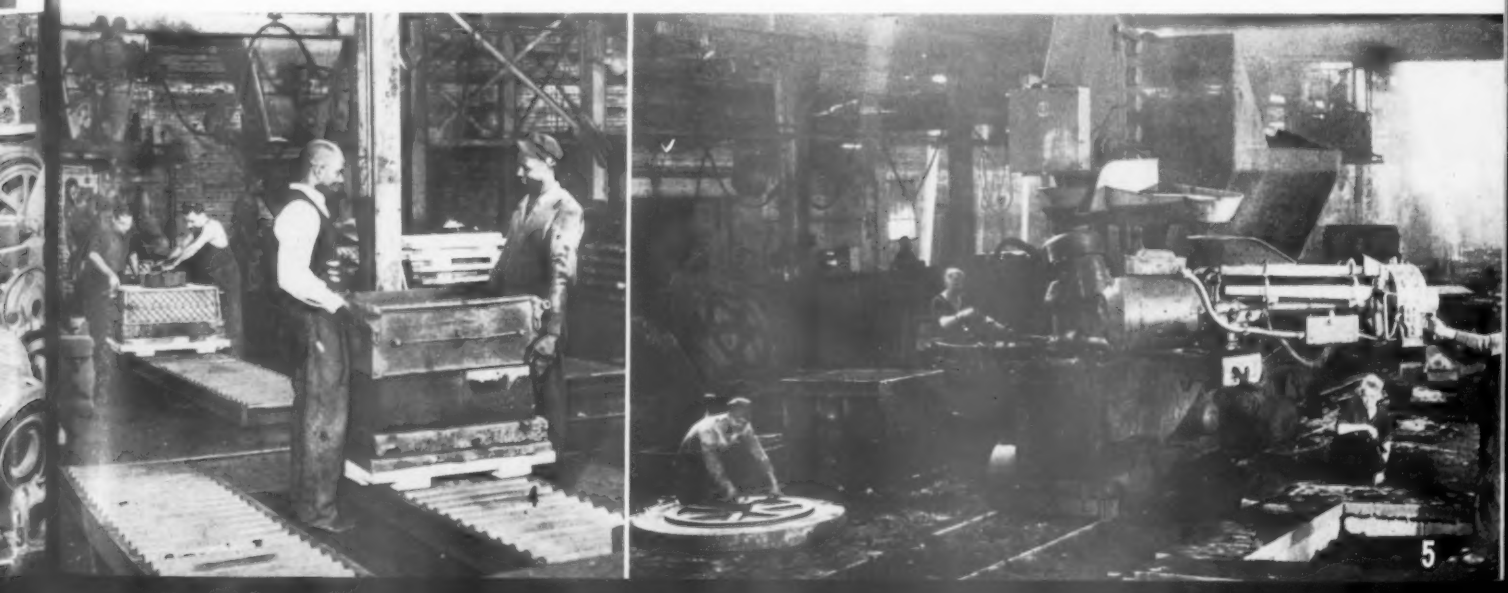
INCREASED demand for castings the last few years has prompted a number of foundries to add new equipment and rearrange facilities to provide additional capacity. One of the interesting examples of this production expansion is the case of the Olney Foundry Division, Link-Belt Co., Philadelphia, which a short time ago completed a comprehensive enlargement program. Without any increase in floor space, and with a minimum of building changes, the company has been able to increase the tonnage of gray iron castings shipped from 400 tons monthly to between 800 and 1000 tons.

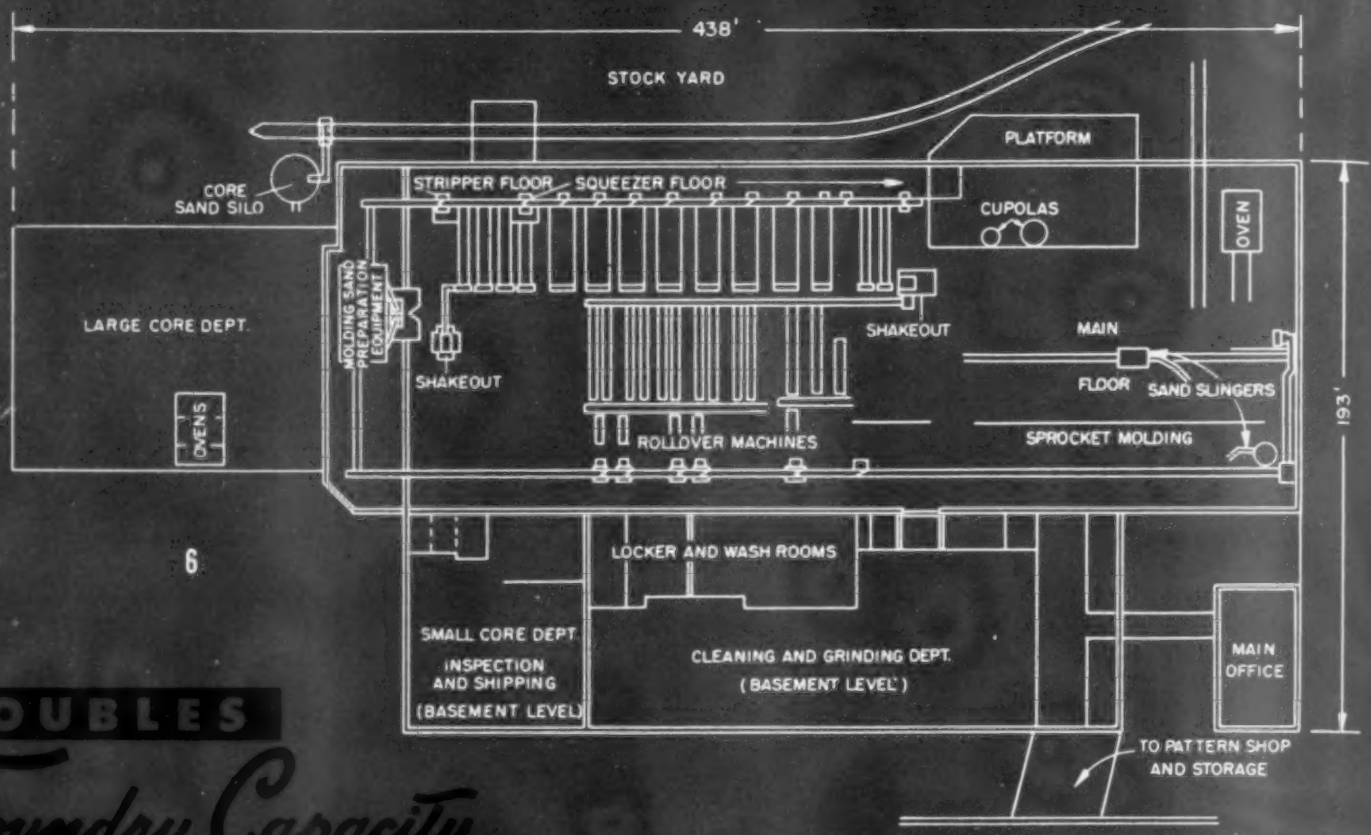
A circumstance which ordinarily would be expected to make it difficult to double capacity without increasing floor area is the fact that the plant is a jobbing foundry, producing a wide variety of castings for both the parent company and other consumers, and melting a number of different analyses of gray iron. Nevertheless, the task was accomplished—and without interrupting operations.

Link-Belt Co. established its foundry in Philadelphia in 1920. In succeeding years, moderate improvements were made to the buildings and equipment, but shipments of castings meanwhile were maintained on a basis of approximately 50 per cent for the company's own requirements and the balance devoted to job casting business. Early in 1944 the company made plans for a large increase in manufacture of speed reducers at another of its Philadelphia plants, with a consequent expansion in casting needs. Since it was decided to maintain the former proportion of jobbing business, it became necessary to arrange for substantially greater foundry capacity to supply the increased tonnage of castings.

An important consideration in the foundry expansion program was to provide sufficient flexibility in facilities to meet delivery requirements of jobbing customers and to handle special metal compositions without interfering with normal runs of the company's own castings. The foundry is able to produce castings varying from a few ounces to 20,000 lb in weight, the average being about 15 lb.

Castings furnished jobbing customers are types employed principally in the textile, oil refining, automotive stamping, machinery, valve and fittings, and oil burner industries. Castings used by the company consist of housings of all types, sprockets, rollers, gear wheels and miscellaneous engineering castings. Some idea of the variety of castings made may be gained from the group assembled in Fig. 3. Such castings are made of varying analyses, including soft gray iron, hard white iron, chilled iron, and alloyed gray iron of different compositions. Long runs are the exception on practically all castings; pattern changes on molding machines average four to six daily, while the department devoted to molding sprockets averages a total of nearly 70 pattern changes daily at its five molding stations. However,





DOUBLES Foundry Capacity

from time to time orders for rather large runs are handled by the foundry without inconvenience and on a competitive basis.

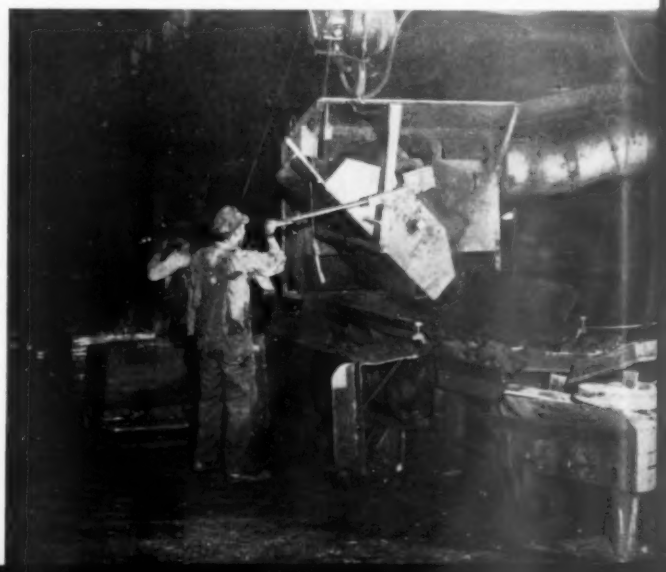
Important features of the present plant layout are a central sand preparation and distribution system, and liberal use of conveyors for mold handling. The sand system also incorporates an oscillating conveyor for handling hot sand and castings in a 30-in. wide portion of its trough, and sand only in the 18-in. wide section of the trough.

The molding floor consists of four major departments—sprocket molding, floor molding, squeezer molding and rollover molding. Work is apportioned among these four areas according to type of casting and quantity to be made.

In the sprocket mold department, part of which is shown in Fig. 2, the molds are made with metal half patterns and rammed by a stationary sandslinger. Barred flasks are used for both cope and drag, without bottom boards. The patterns remain fixed on three stationary pattern plates located on the floor, and a monorail hoist is employed to strip the molds from the pattern, roll over the drag, assemble the molds and set them out for pouring. The sprockets, ranging from 30 to 54 in. diameter, have the tooth profile formed by a metal chill and are poured from a special composition iron which provides a tooth hardness of 400 to 500 brinell.

Adjoining the sprocket mold department, as indicated by the accompanying plant layout sketch, (Fig. 6), is an area devoted to floor molding of medium size and large castings, individual runs on which are small. A motive type sandslinger (Fig. 5) traveling the length of the floor, assists in ramming molds for these castings as well as those made on a large rollover machine (Fig. 1) located at the end of the track. This machine handles molds for the relatively large castings that are required in quantities.

Both the sandslinger in this department and the stationary unit in the sprocket mold department receive their sand supply from an overhead conveyor. The larger castings require facing, but the normal backing sand is satisfactory for medium size molds. The latter are either poured green or are skin dried before pouring, while larger molds are dried either in an oven, located nearby, or by charcoal. Flask sizes



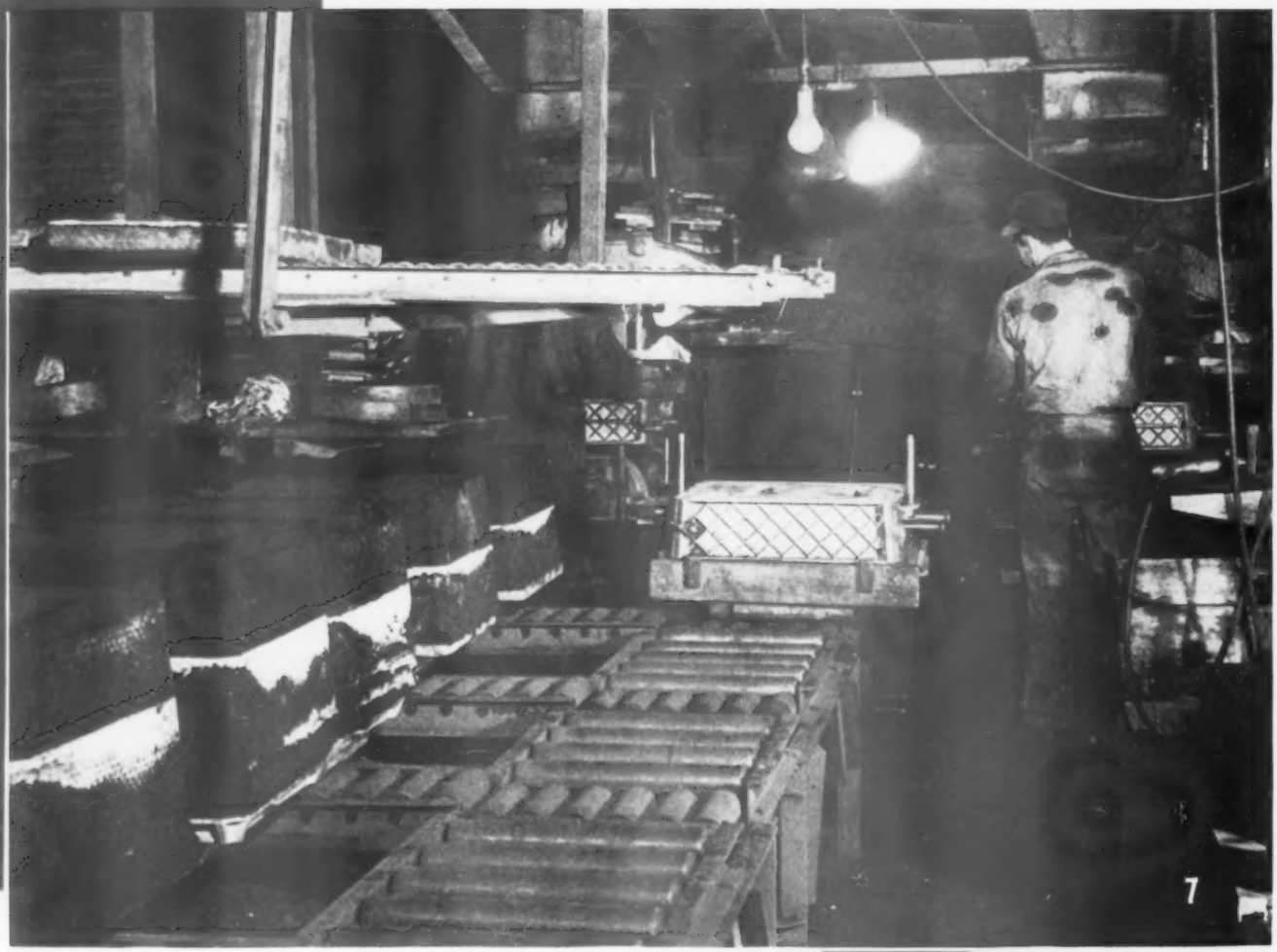
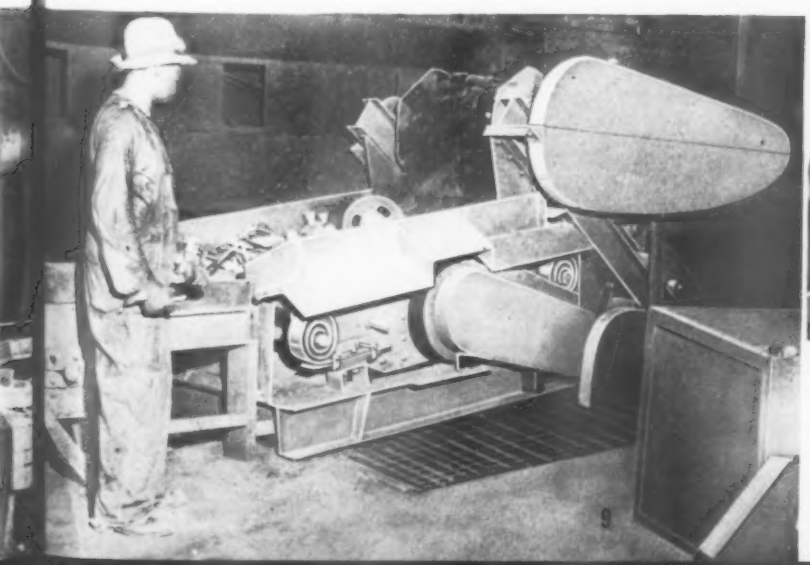


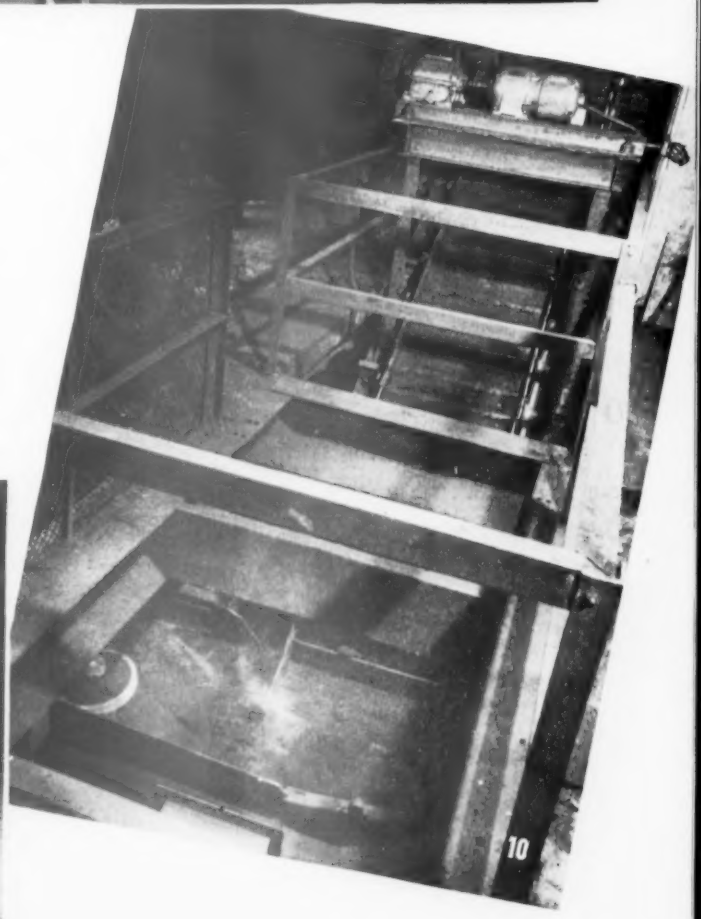
Fig. 6—Sketch showing layout of Olney Foundry's departments

Fig. 7—Transfer boards carry molds by roller conveyor to pouring zone. Boards return to molders by overhead skate wheel conveyor

Fig. 8—Poured molds at end of roller conveyor line are lifted by hoist to shakeout. Exhaust hood traps dust and fumes

Fig. 9—This shakeout handles molds from squeezer floor. Sand and castings are transferred to this point by oscillating conveyor, located under the floor, and the apron conveyor shown in Fig. 10





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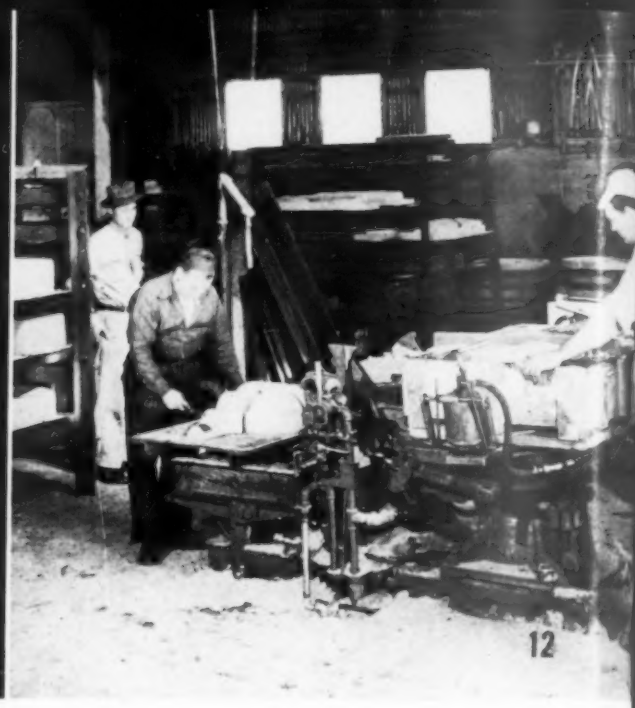


12

DOUBLES

Foundry Capacity

used on this floor vary from 36 x 36 in. to 10 x 10 ft. The largest molds are made in pits, the size limit being about 15 ft square.

When production quantities of medium size castings are required, molds are made on three jolt rollover machines, two of which are used in conjunction with pin stripper units. This department is located along one side of the main foundry floor, and sand is obtained from overhead hoppers. Molds are made in pop-off flasks (Fig. 4), eliminating need for flask storage or a flask return line. Mold sizes range from 22 x 24 in. to 28 x 44 in., with depth of 10 to 24 in.

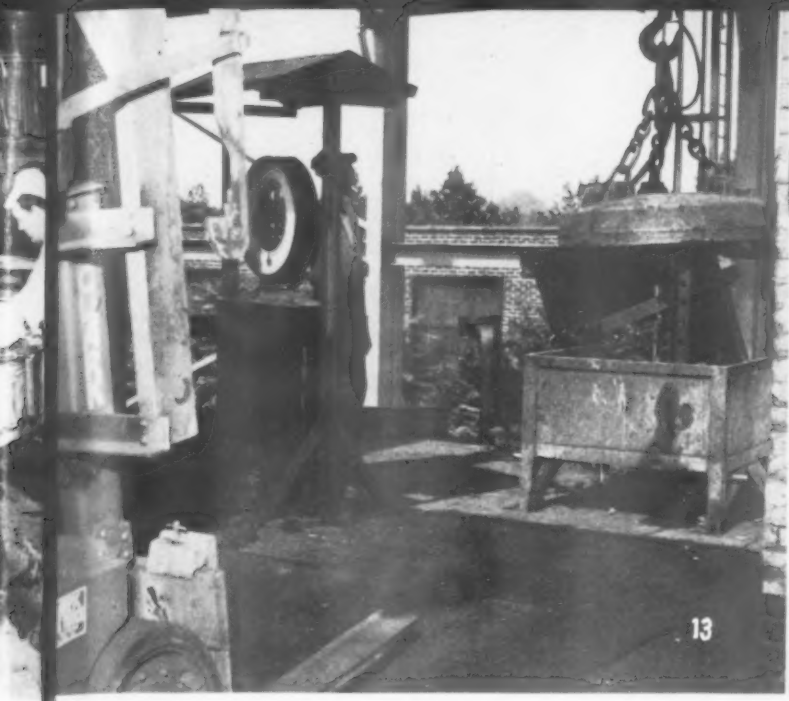
After the drag is rammed it is rolled over onto a short roller conveyor which leads from each machine, and cores are set. The cope is stripped by machine, lifted off by a hoist and closed on the drag. As the molds are completed they are moved over the gravity rolls to a transfer car which spots them onto 12 roll conveyor lines approximately 40 ft long. Here the molds are jacketed and poured. After pouring they move over a transfer point at the end of each gravity line, which is part of a long roll conveyor leading to a shakeout (Fig. 8) located near the center of the pouring area. This shakeout is equipped with an exhaust hood to remove dust and fumes.

In addition to the rollover molds, this shakeout also handles smaller floor molds and the sprocket flasks. Castings discharged from the top of the vibrating screen are collected in boxes and moved by lift truck to the cleaning department. Sand drops through the screen into the smaller portion of the oscillating conveyor mentioned previously. This oscillating conveyor is located in the pit beneath the foundry floor. The sand is discharged at the opposite end of the oscillating conveyor to a belt conveyor leading to the sand conditoning system.

In the widest portion of the oscillating conveyor trough (30 in.), sand and poured castings from the squeezer floor are handled. Thus two varieties of sand and castings of varying sizes are being handled simultaneously in the same conveying unit. Sand and castings from the squeezer floor are then discharged from the oscillating conveyor to a steeply inclined apron conveyor (Fig. 10). In time the apron conveyor discharges to a vibrating shakeout screen (Fig. 9) for separating sand from castings, the castings being deposited into boxes.

The squeezer floor is equipped with eight 10-in. jolt squeeze stations and two stations provided with jolt squeeze, pin strip machines. The latter make separate cope and drag sections of molds, which are closed on transfer boards moved on gravity rolls, as shown in Fig. 7. These boards hold three or four molds and, when loaded, are transferred to the pouring floor over gravity roll conveyors located at right angle to the run-out conveyor. Storage is available for approximately one hour's production. Poured molds are allowed to cool and then are dumped onto the oscillating conveyor. Mold boards are returned to the molding station by a skate wheel conveyor above the mold conveyor, as seen in Fig. 7. Bottom boards are carried manually a short distance to the drag molding unit.

A different mold handling arrangement is employed at the eight jolt squeeze stations, one of which is shown in Fig. 16. These machines have an 18 x 18-in. table and are used for the smaller castings. The setup here was established after careful study of the various motions required of the operator. So far as is practical, wasted motion has been eliminated by properly designed racks, fixtures, etc. Note in Fig. 16 that height of the machine table, racks and conveyor car is uniform and convenient for the operator. Light-metal bottom boards and flasks minimize the weight to be lifted. (*Please turn to page* 118)



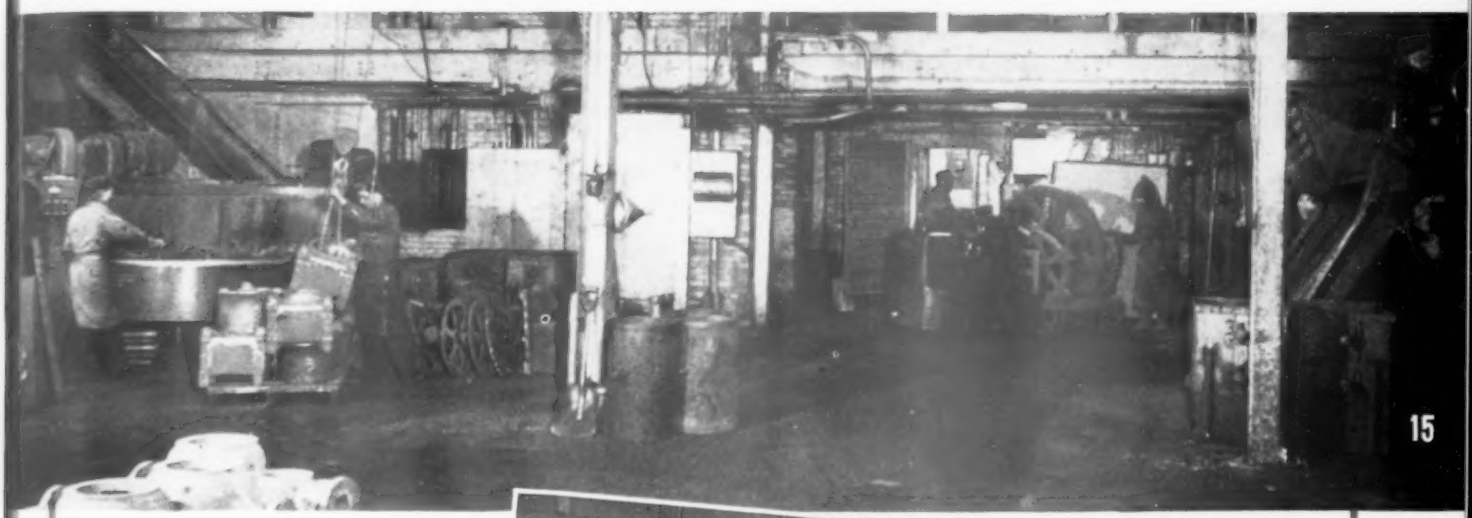


Fig. 11—Molding sand additions are carefully measured. Mullers are provided with automatic control

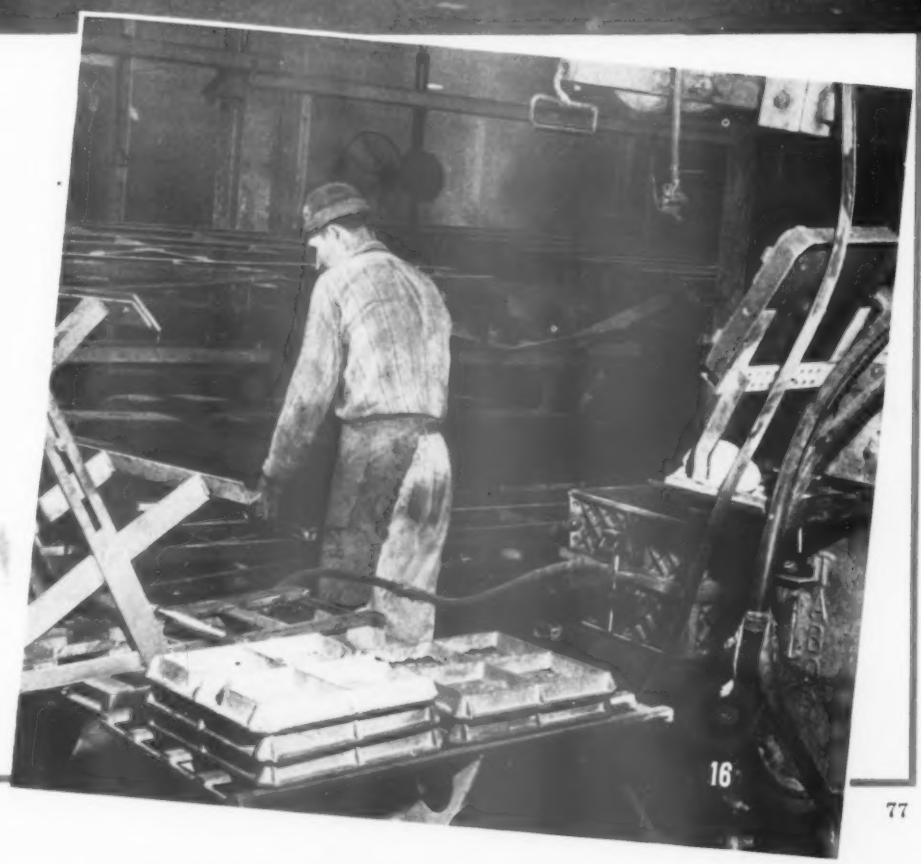
Fig. 12 — Making large cores on jolt rollover draw machine

Fig. 13—Scrap charge being weighed on the cupola charging floor

Fig. 14—Cupola charging is handled by lift truck. Hooks trip charging box to dump contents

Fig. 15—Part of cleaning department showing new blast table at left, barrel at right

Fig. 16—Jolt squeeze stations employ special conveyor cars which are returned on overhead rails after molds are poured



Desulphurizing

WITH SODA ASH

LYNCHBURG Foundry Co. operates two plants with foundries at Lynchburg and Radford, Va. The castings manufactured include a complete line of plow castings, such as chilled plow shares, chilled landsides, standards and other parts for plows as well as a line of high quality castings of the automotive type for use in farm tractors and other farm implements. The same quality iron is used in critical machinery parts, such as compressor bodies and compressor shells, large cylinder liners, and large crankcases for diesel engines. In addition to the items mentioned, the company manufactures de Lavaud centrifugally cast pipe ranging from 3 to 36 in. in diameter, practically all sizes of fittings for water, steam, and gas service, as well as a wide variety of castings for the chemical industry.

Melting equipment consists of seven cupolas, four of which are lined to 72 in. ID, two to 60 in. and one to 48 in. All of these cupolas are of the front slagging type, which means that iron runs continuously from the tap hole as fast as it is melted. Furthermore, either a tilting teapot ladle or stationary forehearth is used in connection with all cupolas. These serve as reservoirs for the storage and mixing, and for refining with fused soda ash, of a quantity of molten iron equal to several cupola charges.

The 72-in. cupolas are served by 10-ton tilting teapot ladles, the cupola trough arrangements being such that when two adjacent cupolas are operated simultaneously, the stream of molten iron from both cupolas runs into the same ladle. The two cupolas lined to 60 in. are never in operation at the same time but are served on alternate days by a single rectangular or box-shaped forehearth of 4000 lb capacity mounted on a car so that it can be moved. The 48-in. cupola is served by a stationary cylindrical forehearth of 3000 lb capacity.

Due to the geographic location of the plants of this company, uninterrupted and economical operation has been dependent upon the use of large percentages of scrap iron in the cupola charge. Under "normal" conditions, when there is an appreciable differential between the cost of pig iron and cast scrap, the use of large percentages of scrap is of vital importance in maintaining reasonable mixture costs. Under present day conditions, with a scarcity of pig iron, continuous and (*Please turn to page* 176)

Fig. 1—Cupola charge with blocks of fused soda ash placed on top. This is one of the first charges placed in the cupola

Fig. 2—Blocks of soda ash being added by means of trough made from steel pipe split longitudinally. Blocks in right foreground are drying over stream of molten metal flowing into a ten-ton teapot

Fig. 3—View of cupola trough from breast hole. Slag being skimmed from iron is shown in center foreground, with slag skimming dam immediately to the left. Cupola is the front-slagging type

Fig. 4—Iron flowing into ladle from one of the 72-in. cupolas. Soda ash is being added by means of a shovel while other blocks are drying on top of the cupola trough. Metal surface in ladle is covered with soda ash slag

By W. W. LEVI
Metallurgist
Lynchburg Foundry Co.
Radford, Va.

Steel Founders' Society

HOLDS ANNUAL MEETING

F. KERMIT DONALDSON
President

PROBLEMS of voluntary allocations of materials, the scrap market, pig iron supply, and personnel relationships were among the subjects featured on the excellent program presented at the annual meeting of the Steel Founders' Society of America held Feb. 11-12 at the Edgewater Beach Hotel, Chicago. One entire session was devoted to reports of the officers and the various committees of the society.

F. Kermit Donaldson, Machined Steel Casting Co., Alliance, O., has been elected president of the Steel Founders' Society and B. P. Hammond, Continental Foundry & Machine Co., Pittsburgh, has been named vice president. Keith Williams, Pratt & Letchworth Co. Inc., Buffalo, has been re-elected treasurer, Leslie C. Thellemann executive vice president and secretary, and Charles W. Briggs technical and research director.

At luncheon on the first day H. B. McCoy, director of the Office of Materials Distribution, Office of Industry Co-operation Department of Commerce, Washington, spoke on "The Government—Industry Voluntary Agreement Program." F. Kermit Donaldson, the new president of the SFSA, presided.

Mr. McCoy presented the background for the voluntary allocations program, and outlined the legislation which authorizes the plan. He stressed the point that government and industry operations under this law are confined to scarce materials, and these must

CHARLES L. HEATER
T & O Medalist

CHARLES L. Heater, awarded the Technical and Operating Medal of the Steel Founders' Society of America, is vice president and a director of American Steel Founders, Chicago. A native of Mandan, N. Dak., Mr. Heater attended public schools there and was graduated from Purdue University in 1917 with a degree in mechanical engineering. Following service with both the British and United States Air Forces in World War I he served for a period as junior mechanical engineer for Charles L. Pillsbury Co., Minneapolis, consulting engineers. He entered American Steel Foundries in 1919 as an apprentice, subsequently becoming sales engineer, sales agent and general sales engineer. He was assistant vice president from 1937 to 1939, when he became vice president. He was made a director in 1946. Mr. Heater is a member of the Ordnance Conference Committee and chairman of the Technical Research Committee of the Steel Founders' Society of America.

B. P. HAMMOND
Vice President

By FRANK G. STEINEBACH
Editor
THE FOUNDRY

have an important effect on the cost of living and industrial and agricultural production. It was pointed out that in no sense is there authority for the government to undertake, even on a voluntary basis, a broad program of allocation of materials and facilities, even though such agreements, for one reason or another, might be desired by government or industry. The initial program includes railway freight cars, agricultural machinery, petroleum equipment and housing. Consideration also is being given to certain chemicals, including caustic soda, soda ash and nitrogen, and possibly to textiles.

Mr. McCoy indicated the construction of one million houses in 1948 is one of the most urgent programs in the domestic economy. Steel and pig iron are essential for the production of building materials. The speaker stated that without an adequate supply of cast iron soil pipe, pressure pipe, bathtubs, radiators, heating equipment, etc., new construction cannot reach the estimated goals. The limiting factor may be the availability of these materials. In the matter of freight car production, Mr. McCoy indicated the program probably will continue on the basis of a monthly total of 10,000 cars, rather than 14,000, which has been discussed recently.

Mr. McCoy stated that the export of steel and steel products in 1948 would be no greater than in 1947, and there is a possibility that the total this year may be less. Given an adequate supply of materials and short stoppages in production, which he admitted was a most optimistic assumption, the speaker predicted that the steel industry again will break all peacetime production records in 1948.

In conclusion, Mr. McCoy indicated he is optimistic that the voluntary agreement program will have considerable success in the four industries where work is under way. Expansion of production of railway cars, farm equipment, agricultural and petroleum equipment and housing, will operate to curb inflation and will assist in meeting commitments for aid to European countries. One test of our free democratic institutions, he stated, is that we have within such a system the resources and the willingness on the part of management to achieve objectives that are of public interest and that these objectives can be reached through co-operative action.

Following the luncheon on Wednesday, President Donaldson paid tribute to the steel foundries which had outstanding safety records in 1947. These included the following:

Perfect records with no lost time injuries for 2 years, Berkley Foundry & Machine Works, Norfolk, Va., and Eastern Malleable Iron Co., Wilmington, Del. Perfect records for (*Please turn to page* 186)

EDGAR D. Flintermann, awarded the Lorenz Medal of the Steel Founders' Society of America, is president and general manager of Michigan Steel Casting Co., Detroit. Mr. Flintermann was born in Deadwood, S. Dak., was educated in the Detroit public schools and received a degree in mechanical engineering from University of Michigan in 1922. He worked in the shops of Gray Motor Co., Midland Steel Products Co., and Gear Grinding Machine Co., until 1924, when he entered the foundry of Michigan Steel Casting Co. Three years later he became a salesman for the company and in 1929 was made sales manager. He has been president and general manager since 1934. Active in the Steel Founders' Society for many years, he served as a director in 1944 and 1945 and was elected president for the year 1946-47. He is a director of the Employers Association of Detroit, Michigan & Wilcox Forging Corp., Mechanicsburg, Pa., and Michigan Mutual Liability Co., Detroit.

EDGAR D. FLINTERMANN
Lorenz Medalist

Continuing last month's discussion of melting and pouring operations, this article describes fluxing, grain refining practices and pouring procedure in the aluminum foundry. It is the fifth of a series of articles based on a survey sponsored by the Foundry Division of the Aluminum Association

Aluminum Alloy

AS MENTIONED previously (THE FOUNDRY, March), the tendency of aluminum to dissolve hydrogen and to oxidize are two of the most troublesome factors that must be guarded against throughout the entire casting procedure. Hydrogen dissolved in the molten metal at high temperatures will be liberated upon solidification, causing porosity. Oxide trapped within the melt will result in inclusions in the completed castings. Fortunately, measures taken to control one of these factors also mitigates the other.

Of first importance is the maintenance of the melting and holding temperatures to as low values as are practicable, for both tendencies increase with increasing temperature. A satisfactory temperature for many alloys is from about 1300 to 1350° F for both melting and pouring, the exact temperature in any specific case depending on the alloy, the type of casting, and other foundry variables.

The oxide film that protects aluminum from surface corrosion at ordinary temperatures also protects the molten metal, provided the melt is not agitated strongly enough to ripple the surface. The absorption of hydrogen is relatively slow when the oxide covering is undisturbed. The oxide also prevents the molten metal from reacting with moisture in the furnace atmosphere. Skimming removes the oxide covering, which increases the gas absorption and oxidation, because a new oxide film forms whenever the surface of the molten metal is exposed. Frequent skimming therefore should be avoided.

Procedures that will minimize both hydrogen absorption and oxidation troubles, if carefully carried out, may be summarized as follows:

1. Keep the temperature of the molten metal as low as possible, consistent with the pouring temperature required to produce the casting.
2. Hold the metal in molten condition no longer than necessary.
3. Keep the humidity low in the furnace atmosphere and pouring room.
4. Avoid contact with combustion gases.
5. Agitate the melt as little as possible; if it must be stirred, be careful to disturb the surface no more than necessary.
6. Skim only when ready to pour, except as modified by fluxing practice.
7. Avoid introducing hydrogen-producing materials below the surface of the metal.

In spite of careful procedures, troublesome amounts of hydrogen sometimes may be absorbed and oxide inclusions may become trapped in the melt. Unlike oxides of other metals, aluminum oxide has approximately the same density as the molten metal itself so that there is little gravity separation of the oxide from the melt. For this reason fluxing is necessary to cause the entrapped oxides to rise to the surface.

To remove dissolved hydrogen the metal may be held for a long time at a temperature just above the melting point. Slow solidification in the remelting furnace followed by rapid remelting also will remove most of the hydrogen, but of course involves additional furnace time. A third method, and perhaps the most common, is that of fluxing the molten metal with either an inert gas such as nitrogen or with chlorine or one of the volatile chlorides.

Fluxing—An aid in keeping to a minimum dissolved gas, oxides and dross in the molten metal, fluxing is in no sense a remedy for careless remelting and metal-handling practices. Two types of fluxes are in common use for foundry remelting operations: (1) those which prevent gas absorption and oxidation; and (2) those which remove dissolved gas and entrapped oxide and dross.

Fluxes of the first type produce either a molten protective layer over the surface of the melt or volatilize to blanket the surface with a cover of inert gas. Fluxes employed to provide a liquid cover are used mostly for alloys containing substantial percentages of magnesium, such as alloys G1 and G3, and are not often required for others.

Castings

By FLOYD A. LEWIS
Technical Consultant
Aluminum Association

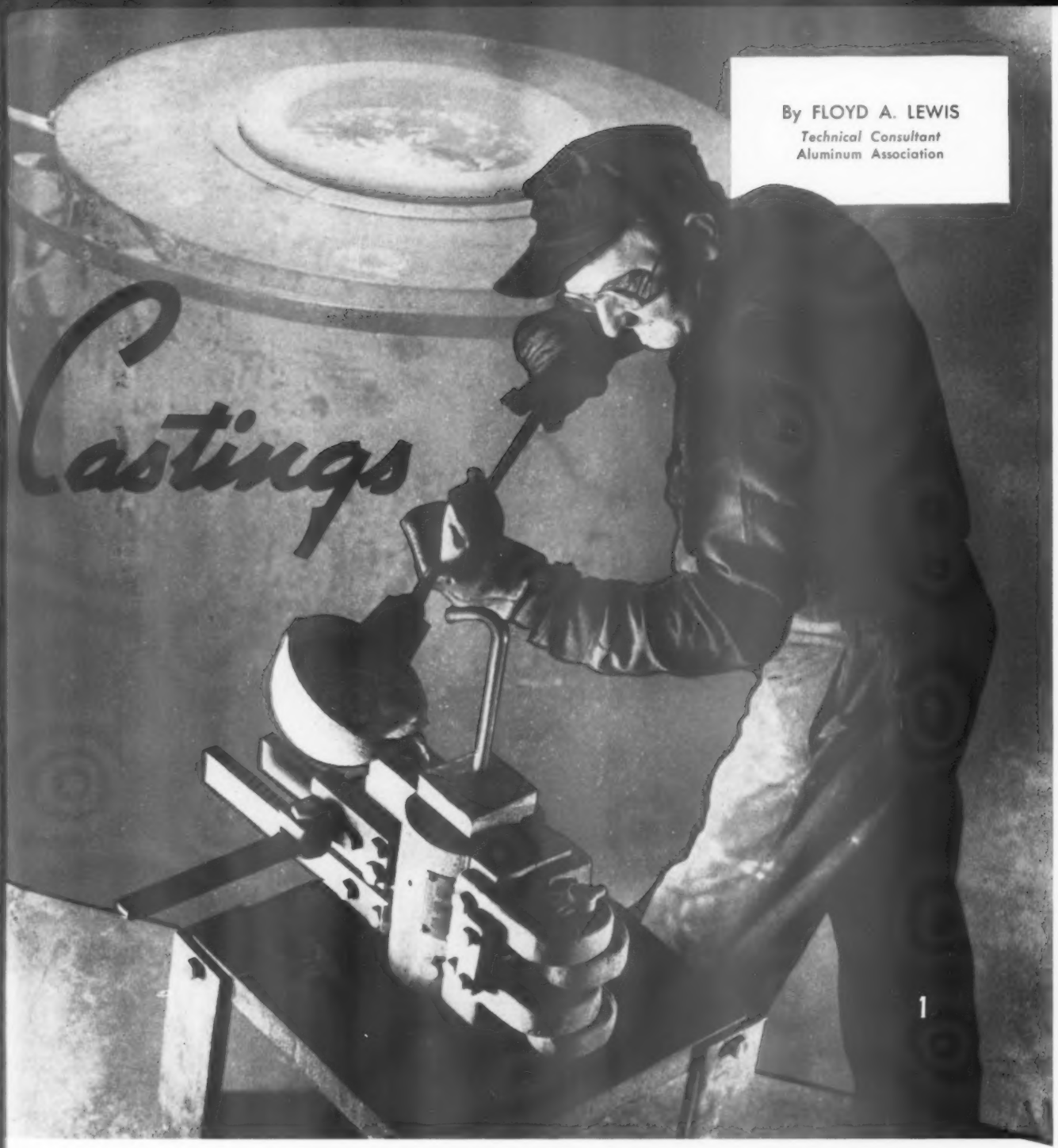


Fig. 1—Hand pouring an aluminum casting in a permanent mold

To reduce dissolved gas and entrapped oxides and dross, either gaseous fluxes or solid fluxes that vaporize at the temperature of the molten metal are used. Both types are introduced at the bottom of the melt, the gases through a refractory or a coated iron tube and the solids by plunging them directly into the molten metal. In both cases, the gases bubble up through the melt and carry the dissolved gas and dross to the surface.

The solid fluxes, of which zinc chloride and aluminum chloride are typical, are used mostly in alloying operations in large open-hearth furnaces. About one-tenth of a pound of flux is used per 100 pounds of metal. A perforated tool resembling an inverted cup is used to immerse and hold the flux, which usually is prepared in capsule form, at the bottom of the melt. Vapors escaping from surface of the metal react with the moisture of the air to form hydrogen chloride, which is very irritating to the eyes, nose, and throat; therefore proper hooding and ventilation is necessary. Zinc chloride cannot be used with alloys in which the zinc content must be kept low, because this salt reacts with molten aluminum to liberate zinc which is dissolved in the alloy.

Chlorine and the inert gas nitrogen are the most commonly used gaseous fluxes. With the inert gases the action is probably largely mechanical, the bubbles of gas rising through the melt providing surfaces upon which the absorbed gas may cling or through which it may pass. In addition, the agitation of the

melt also provides the mobility which helps the oxides and dross to reach the surface.

The action of chlorine is chemical as well as mechanical, which makes this gas a particularly effective fluxing agent. Its advantages are partially offset, however, by its tendency to coarsen the grain and to remove some of the more active alloying elements, one of which is magnesium. Its use also entails a health hazard and, like the volatile chlorides, requires proper hooding and ventilation.

With chlorine and the volatile chlorides, the fluxing operation should be done at a melt temperature of about 1350°F. With the inert gases it is usually done at the lowest possible temperature — about 1250°F. Before inserting the fluxing tube into the melt, it is heated to drive off the moisture. The rate of gas delivery is adjusted so as not to produce excessive agitation at the surface, but to give a gentle rolling action. At this rate fluxing should proceed for a period of from 10 to 20 minutes for a 300-400 lb heat.

All fluxing material must be kept free of moisture, otherwise more harm than good may result from its use. Most solid fluxes have a tendency to absorb moisture and therefore must be kept dry. Gaseous fluxes must be free of hydrogen and oil vapors as well as moisture.

Another type of solid flux that performs a dif-

Fig. 2—Correct temperature and avoidance of turbulence are important in pouring aluminum

Fig. 3 — Pouring an aluminum alloy piano plate casting in a sand mold

Fig. 4—Gas-fluxing molten aluminum in a holding furnace. The gas is introduced at the bottom of the melt through a tube

ferent function and is used mostly in the compounding of alloys and in other large open-hearth operations imparts a dry or mealy consistency to the surface dross. This facilitates skimming and decreases the loss of entrained aluminum incidental to this operation. Mixtures of 50 per cent sodium chloride and 50 per cent potassium chloride, or 75 per cent potassium chloride and 25 per cent cryolite are typical of this class of flux. In use, it is sprinkled on top of the melt and worked into the metal.

Grain Refiners—Several elements may be alloyed with aluminum to produce a finer grain or other structural modification of the metal. Most commonly used is titanium; others are boron, chromium, and sodium. Besides improving the grain structure of the metal, grain refiners also reduce casting stresses and permit reduced time of solution heat treatment because of the better dispersion of alloying elements.

Titanium usually is added in the form of a 1½, 3, or 6 per cent hardener, in amounts totaling from 0.1 to 0.2 per cent of the alloy. In a few instances larger percentages are added, but the amount must be carefully controlled as excess titanium acts somewhat like iron in the alloy.

Boron may be added in the form of aluminum-boron, aluminum-boron-manganese, or aluminum-boron-titanium hardeners. The use of either solid or gaseous fluxes containing boron also will produce fine grain in some alloys. They are cheaper than the hardeners but are not as simple to handle.

Chromium usually is added in the form of an aluminum-chromium hardener. Sodium does not affect the grain size of aluminum, but it does modify the silicon crystals in aluminum-silicon alloys, thereby improving ductility and increasing strength. Sodium additions are quite effective on aluminum-silicon and aluminum-silicon-copper alloys of low copper content, but less so with higher copper content. Like titanium, sodium additions must be carefully controlled, too large quantities making the alloys somewhat sluggish.

To obtain optimum benefits, grain refiners must be added as late as possible in the melting cycle prior to pouring. Overheating after adding the grain refiner must be avoided as this destroys its effectiveness.

Pouring Procedure—Maintenance of optimum pouring temperature and of procedures to assure the least possible turbulence in the molten metal are perhaps the two most important factors in pouring aluminum alloys. In general, the pouring should be done at as low a temperature as the design of the particular casting will permit.

Pouring temperature is considered the greatest single factor influencing the fluidity or mold-filling property of an alloy, and the lowest temperature at which the metal can be poured without cold shuts or misruns, and still permit separation of any oxide that forms, usually is the best. For any given casting, this optimum pouring temperature can best be determined by experiment.

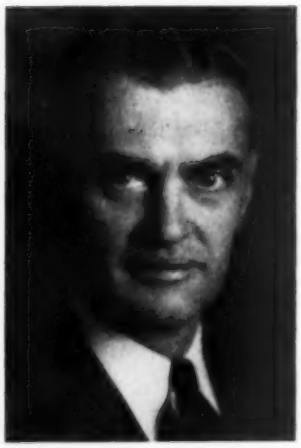
As already discussed, care to avoid disturbing the oxide coating on the surface of the melt will minimize further oxidation and gas absorption. This is particularly important after the fluxing operation has been completed. Excessive skimming also should be avoided, as a new oxide coating forms every time the melt is skimmed. It is good practice wherever possible to skim only when ready to pour.

Each individual foundry will develop the details of its own pouring practice, but a good basic procedure is as follows: After the metal reaches the proper temperature and after fluxing, when this operation is necessary, the resulting dross should be skimmed off. The melt may then be allowed to settle for from 15 to 30 minutes. During this time, the temperature is raised gradually to a point slightly above the pouring temperature. The metal then may be skimmed again and transferred to the pouring ladle. The temperature of the molten metal in the ladle is then checked, and when the predetermined optimum pouring temperature is reached, the metal is poured into the mold.

In transferring the metal (*Please turn to page* 196)

A·S·T·M And the Foundry

DR. G. H. CLAMER
(Nonferrous Metals)



D. L. COLWELL
(Aluminum Alloy)

W. A. KENNEDY
(Malleable Iron)

THIS year, when the thoughts of all foundrymen are turned toward Philadelphia and the 52nd annual meeting of the American Foundrymen's Association, it seems particularly appropriate to recall that the City of Brotherly Love is the headquarters of the American Society for Testing Materials and to review the work of interest to the foundry industry that ASTM has carried on through the past half-century.

The activities of ASTM and AFA have been interwoven over a long period, with many individuals taking a prominent part in the activities of both organizations, as a little delving into history shows very clearly. For example, the early records of AFA and ASTM show the prominent part Dr. Richard Moldenke took in the activities of both societies from the beginning. He was the second secretary of AFA, serving in that capacity from 1900 to 1914. He became a member of the International Association for Testing Materials in 1896, two years before he participated with other American members in forming the American section of the IATM which, five years later in 1902, became the American Society for Testing Materials. In ASTM he served on the executive committee (1911-13) and as vice president (1913-15).

Steel Castings—One would naturally expect the earliest activity of ASTM in the foundry field to be in the realm of cast iron. While there was, as we shall see, much early activity in this field, it is interesting to note that the first ASTM foundry industry specification was for steel castings.

Before the ASTM was incorporated, the American section issued a number of specifications in the form of bulletins. Bulletin No. 16, issued in May, 1900, was a proposed Specification for Steel Castings, submitted by William R. Webster, one of the charter members of ASTM, on behalf of a committee which became Committee A-1 on Steel. This original specification called for three grades of steel castings—hard, medium and soft—and the major part of its provisions are now incorporated in the Specification for Mild- to Medium-Strength Carbon-Steel Castings for General Application (A 27). In the intervening years under the guidance of what is now Subcommittee VIII on Steel Castings of Committee A-1, a number of specifications have been prepared and published, including A 128 for Austenitic Manganese-Steel Castings, and A 148 for High-Strength Steel Castings for Structural Purposes. The chairman of Subcommittee VIII is currently M. V. Healy of the General Electric Co. with N. L. Mochel of Westinghouse Electric Corp., also chairman of Committee A-1, as vice-chairman.

Also in Committee A-1, Subcommittee XXII on Valves, Fittings, Piping and Flanges for High-Temperature and Subatmospheric Temperature has prepared, under the direction of the Section on Steel Castings of which J. J. Kanter of Crane Co. is chairman, a number of specifications for steel castings applicable to high-temperature service. These include A 95 for Carbon Steel and A 157 for Alloy Steel Castings for Valves,

By CARTER S. COLE
Assistant Technical Secretary
American Society for Testing Materials
Philadelphia

...y Industry

M. V. HEALEY
(Steel)

Flanges and Fittings and A 216 for Carbon Steel and A 217 for Alloy Steel Castings Suitable for Fusion Welding.

In ASTM the work on corrosion-resisting steels is centered in Committee A-10 on Iron-Chromium, Iron-Chromium-Nickel and Related Alloys whose chairman is now Jerome Strauss of the Vanadium Corp. of America. This committee became a separate entity in 1929, and its Subcommittee X on Castings is headed by J. J. Kanter of the Crane Co. Recently, the Specifications for Corrosion- and Heat-Resisting Castings have been combined under two comprehensive specifications, A 296 and A 297, respectively, with twelve alloys included in the former and ten in the latter.

At the annual meeting of ASTM at Atlantic City in June, 1932, a joint symposium was held with AFA on the subject of Steel Castings which was quite comprehensive in scope, covering many subjects of interest to foundrymen. W. C. Hamilton, American Steel Foundries, was chairman of the committee which organized the program which he opened with a general survey of the industry.

J. J. KANTER
(Steel and Malleable Iron)

Maj. R. A. Bull, director of the Electric Steel Founder's Research Group, who took an active part in ASTM work in the foundry field, presented a paper at this symposium on purchase requirements. Others, well known in the foundry field, who participated were: G. P. Rogers, Steel Founders' Society of America, who presented statistical data; F. A. Lorenz, Jr., American Steel Foundries, who spoke on design; Fred Grotts, Continental Roll & Steel Foundry Co., who talked about medium pearlitic steels; Jerome Strauss, who discussed corrosion-resistant steels, and John Howe Hall, who spoke on austenitic manganese steel. At this same symposium C. H. Lorig and C. E. Williams, Battelle Memorial Institute, presented extensive data on mechanical and physical properties, while A. W. Lorenz, Bucyrus-Erie Co., discussed heat treatment and T. S. Quinn, Lebanon Steel Foundry, covered the subject of fusion welding.

Radiographic Standards—Of particular interest to foundrymen making steel castings are the radiographic standards which have just been published by ASTM. These comprise two sets of 31 negatives each for x-ray and gamma ray inspection of castings. They were adapted for general use from standards originally developed by the Navy and widely used during the war. C. W. Briggs of the Steel Founders' Society of America and also AFA representative of ASTM Committee E-7 on Radiographic Testing, under whose sponsorship they are published, took a very active part in their preparation.

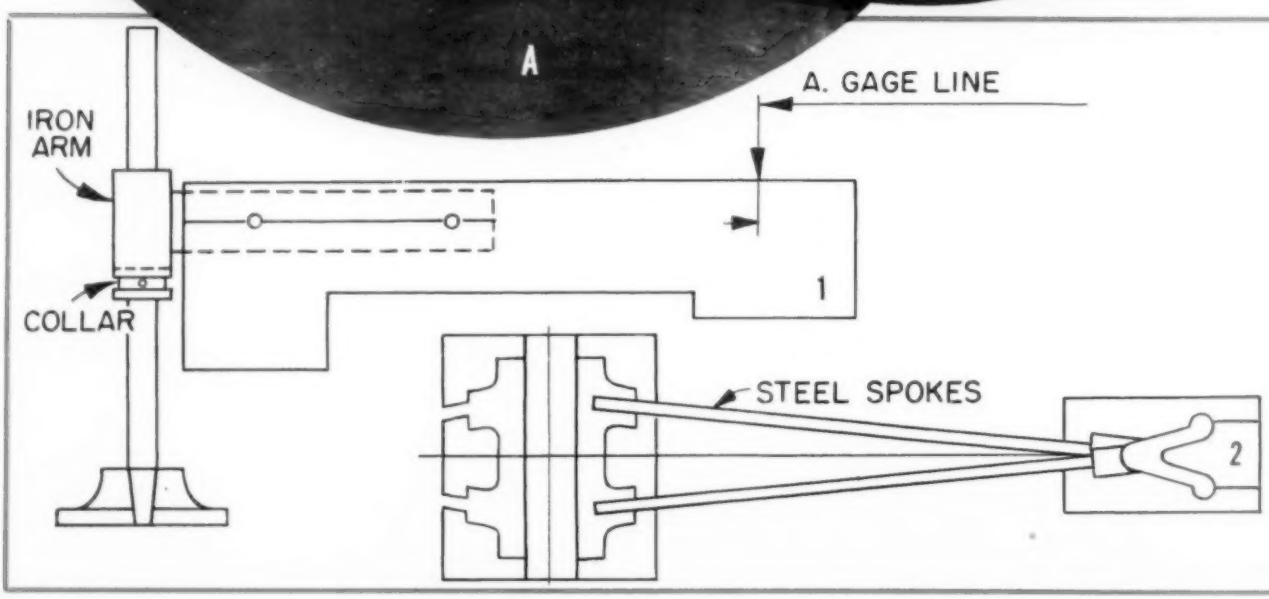
These standards group castings in accordance with the requirements of the service in which they will be used. The standards themselves are classified in seven groups covering gas and blowholes, sand spots and inclusions, internal shrinkage, hot tears, cracks, unfused chaplets and internal chills. For each class of castings in each group the standards are identified as showing defects which are acceptable, borderline, or unacceptable. With these standards now available for general commercial use, the steel foundryman has a real inspection tool to help him improve the quality of his product.

DR. J. T. MacKENZIE
(Cast Iron)

Cast Iron—Close co-operation has been maintained from the beginning between ASTM and the foundry industry (*Please turn to page* 252)

Molding Sheaves in Dry Sand Cores

By WILLIAM PINK
Foundry Superintendent
Manitoba Bridge & Iron Works Ltd.
Winnipeg, Manitoba



METHOD of molding large cast iron sheave wheels at the plant of the Manitoba Bridge & Iron Works Ltd., Winnipeg, Manitoba, is illustrated here. The wheels pictured in Fig. *A* are 8 ft pitch diameter, cast iron rim and hub, and grooved for 1¼-in wire rope. Wheels and other equipment are supplied the extensive mining interests in the great north country. Active life of each wheel is extended by attaching hard iron wearing segments in the bottom of the wheel groove in the rim.

Cores are made in five coreboxes, one for the center or shaft opening, one for the upper and lower part of the rim, one for the groove (two identical halves pasted), one for the outside of the upper and lower hubs, and one for the space between the hubs. Prints for the steel spokes, in this instance ten for each hub, are incorporated in the rim and hub cores. In the illustrations it will be noted that the spokes leave the rim bosses at an angle. One set of ten points to the upper hub, while the second set points down to the lower hub. The construction is similar to the familiar bicycle wheel and the old style wire wheels on certain types of automobiles.

Spokes are steel rods cut to the required length, slightly bent at each end to lie flat in the core prints. A 5/16-in. hole is drilled near each spoke and to serve as vent and anchor. In the blacksmith shop the ends are split and flared, and are nicked with a chisel for 3 or 4 in. to assure a firm grip by the surrounding cast iron. For the same purpose the ends are sandblasted and then dipped in ordinary red lead paint. At various times and in other foundries many materials have been employed as a coating to prevent the formation of iron oxide or scale on the spoke ends. Experience has shown that film of scale, oxide—or just plain ordinary rust, in the foundry vernacular—will create as much if not more trouble than a film of moisture. Gas developed from rust becomes trapped in the surrounding molten iron to form one large or a great number of small blow holes in that part of the casting in the vicinity of the gas producer. Protective coatings include kerosene oil, machine oil, tar, chalk, and — in extreme cases — steel inserts are dipped into a pot of molten tin. Red lead paint is a cheap and satisfactory coating for the spoke ends.

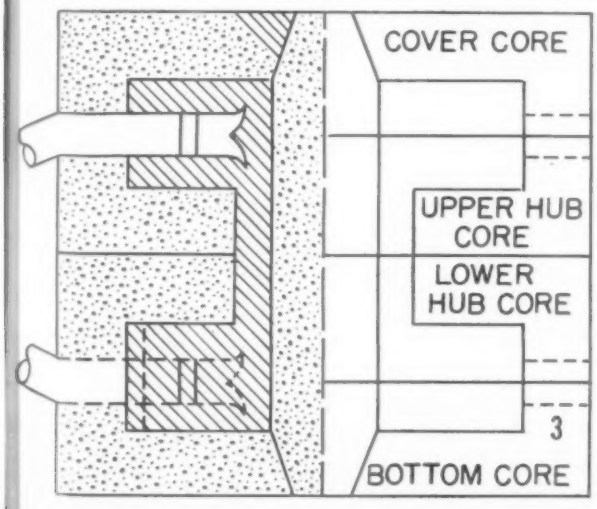
Method adopted for making the casting eliminates practically all hazard. The job may be entrusted to any ordinarily intelligent operator.

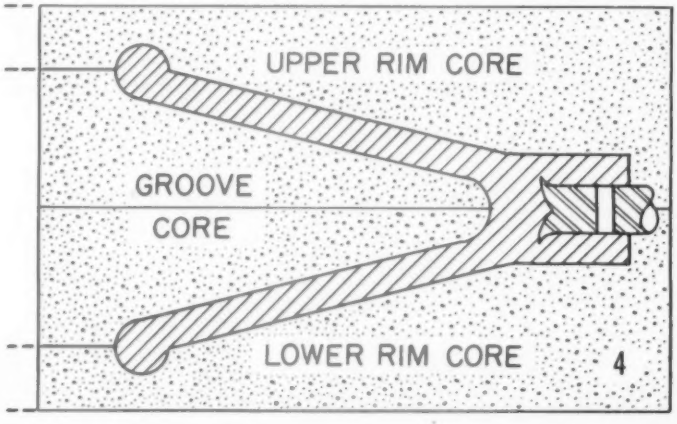
A spindle and sweep (Fig. 1) are set up and a level sand bed is formed on the floor. Extensions on the sweep board on the inner and outer ends form a seat respectively for the lower hub core (Fig. 3) and the lower rim core (Fig. 4). Spindle and sweep are removed and the first set of ten steel spokes is adjusted with the outer ends resting in the rim core prints, and the inner ends resting in the corresponding prints in the bottom hub core. The upper and lower hub cores, back to back are placed on top of the bottom core. The prints on the lower face of the center hub enclose the upper faces of the first set of spokes in the hub. Prints in the upper face of the core are in position to receive the inner ends of the second or upper set of spokes. The outer ends rest in the remaining set of prints in the rim cores.

The rim core, made in halves and pasted, is placed in position with the outer end resting on the outer extension of the groove core. Generous inside and outside core prints hold the groove core in proper position when the mold is filled with molten iron. Accurate thickness is an important factor in these wheels, which are tested for balance before they are accepted. Fig. 2 shows cores and spokes in place.

With the center core, the hub-covering core and the upper rim core in position, the mold is surrounded by a large flask or other form of curbing and sand is rammed around the cores. Runners and risers are made up and weights are placed on the cores. Metal is poured from two ladles through gates at opposite sides of the mold. The rim is cast first. If the rim can be cooled and stripped early in the heat, the hub may be poured the same day. However, the usual practice is to wait until the following day. By that time the rim has contracted to the natural limit and no tension will be imposed on the spokes when the hub is poured.

Rim and groove cores are made in ten sections, with the ends on radial lines for a close fit.





By RAYMOND L. COLLIER
Executive Vice President
Gray Iron Founders' Society

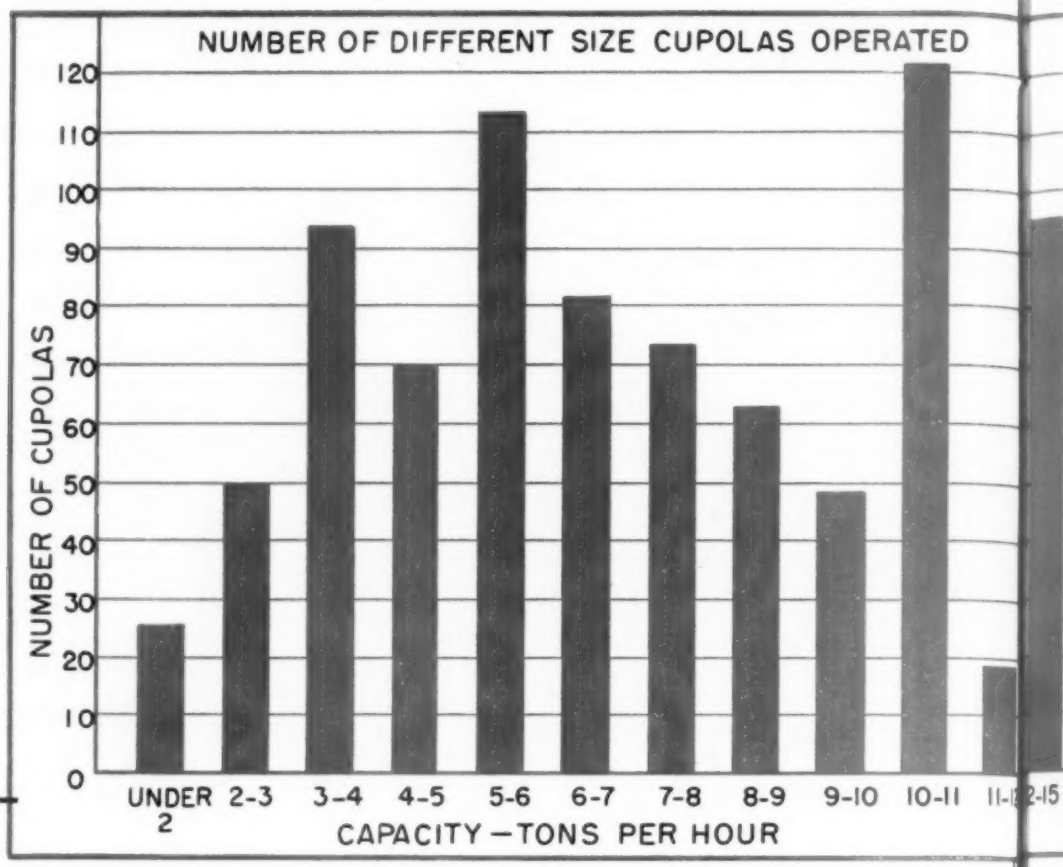


Chart showing number of different size cupolas operated by gray iron foundries participating in the survey

TABLE XIII—Sales Promotion and Expenditures by Gray Iron Foundries

Type of Advertising	No.	Amount	No.	Amount	No.	Amount
Trade Paper	76	$93,759	14	$58,650	90	$152,409
Direct Mail	72	94,107	11	41,450	83	135,557
Miscellaneous	63	4,696	4	Not Reptd.	67	4,696
TOTALS		$192,562		$100,100		$292,662

TABLE XIV—Principal Product Specifications Used by Gray Iron Foundries

Sponsoring Organization	No. of Foundries Reporting Use: Jobbing Foundries	Captive Foundries	Total
American Society for Testing Materials	213	32	245
American Society of Mechanical Engineers *	39	12	51
Society for Automotive Engineers	47	3	50
Federal (U. S. Government)	35	5	40
Navy Dept. (Bureau of Ships)	31	4	35
Own Company (Private)	19	7	26
Association of American Railroads	12	3	15
Meehanite Institute	12	1	13
Customers (Private)	11	0	11
American Petroleum Institute **	9	2	11
American Bureau of Shipping	6	1	7
Miscellaneous	12	3	15
TOTALS	446	73	519

* Identical with ASTM specifications. ** Refer to ASTM specifications and considered here as identical.

TABLE XV—Production Trends—Special High Test Irons

	Jobbing Foundries	Captive Foundries	Total
Regularly Producing H. T. Irons	212	34	246
Note Increase	136	21	157
Note Decrease	50	10	60
Note No Change	93	16	109

TABLE XVI—Metallic Raw Materials Melted by 500 Gray Iron Foundries—1946 (Gross Tons)

Commodity & Grade	Jobbing Foundries No.	Jobbing Foundries Amount, G.T.	Captive Foundries No.	Captive Foundries Amount, G.T.	Total No.	Total Amount, G.T.
Pig Iron-Low Phos.	79	67,539	15	21,861	94	89,400
Pig Iron Bessemer	22	63,887	5	6,419	27	70,306
Pig Iron Malleable	185	430,087	28	97,761	213	527,848
Pig Iron Fdry-Northern	188	348,683	46	118,179	234	466,862
Pig Iron Fdry-Southern	88	148,440	18	46,465	106	194,905
Pig Iron Silvery (High Si.)	151	90,086	26	13,296	177	103,382
Total Pig Iron		1,148,722		303,981		1,452,703
Scrap-No. 1 Cupola Cast	427	604,751	63	114,334	490	719,085
Scrap Burnt Cast	7	3,599	1	48	8	3,647
Scrap Brake Shoes	6	2,100	1	260	7	2,360
Scrap Clean Auto	72	88,072	11	39,514	83	127,586
Scrap Unstripped Auto	13	11,094	1	55	14	11,149
Scrap Stove Plate	42	20,944	9	25,242	51	46,186
Scrap Railroad Cast	16	5,246	4	4,800	20	10,046
Scrap Misc. & Mixed (Cast)	25	40,741	5	9,668	30	50,409
Total Cast Scrap		776,547		193,921		970,468
Scrap—Angles & Splice Bars	42	21,329	7	1,636	49	22,965
Scrap Misc. Structural	130	115,807	23	14,130	153	129,937
Scrap Rails	151	130,087	16	14,545	167	144,632
Scrap Rail Crops	30	26,052	2	750	32	26,802
Scrap Misc. & Mixed (Steel)	52	48,088	9	71,623	61	119,711
Total Steel Scrap		341,363		102,684		444,047

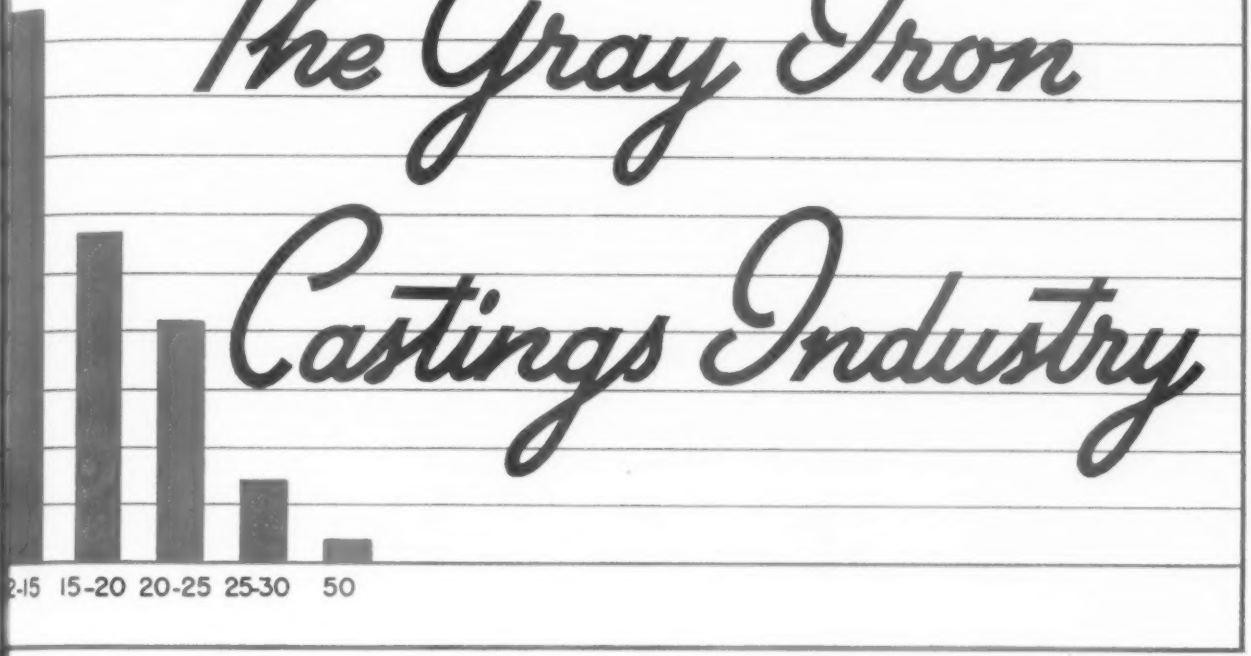
TABLE XVII—1946 Consumption of Foundry Coke by 500 Gray Iron Foundries (Net Tons)

Type of Coke	Jobbing Foundries No.	Jobbing Foundries Amount, N.T.	Captive Foundries No.	Captive Foundries Amount, N.T.	Total No.	Total Amount, N.T.
By-Product	393	484,506	68	159,353	461	643,859
Beehive	60	53,762	6	2,838	66	56,600
Total		538,268		162,191		700,459

TABLE XVIII—Normal Number Full-Time Employees—601 Gray Iron Foundries

Jobbing Foundries: No. of Fdrys.	Jobbing Foundries: No. of Employees	Captive Foundries: No. of Fdrys.	Captive Foundries: No. of Employees	Total: No. of Fdrys.	Total: No. of Employes
507	61,966	94	20,097	601	82,063

The Gray Iron Castings Industry



Additional data pertaining to gray iron foundries are presented in this second of two articles which constitute part of an extensive survey-report prepared recently by the Gray Iron Founders' Society

AMONG the foundries participating in this survey, 437 jobbing foundries reported market areas extending within an average radius of 225 miles from their plants. Two foundries reported strictly local sales and eight said they marketed their products all over the United States. From conversations with gray iron foundry executives in various parts of the country, it was expected that the average marketing radius would prove to be less than half the distance revealed by the survey. The gray iron castings business is not a strictly local one. Its average marketing radius is comparable with that of other heavy metals industries.

Gray Iron Imports—Records and reports of the U. S. Tariff Commission for recent years show that imports of gray iron castings into the United States are negligible. What little tonnage is involved has consisted largely of cast iron pipe. Although the duty on gray iron castings under trade agreements is only 10 per cent ad valorem, the high ratio of bulk to declared value and the cost of oceanic transportation can, it is believed, be depended upon to protect American foundries against serious foreign competition.

Selling Prices and Profits—At the present rate of shipments (about 12,000,000 tons of gray iron castings per year) the total annual sales (or equivalent market value in the case of captive foundry shipments) would aggregate close to two billion dollars ($2,000,000,000). This estimate is based on such meager published price information as is available, some of it dating back to 1941.

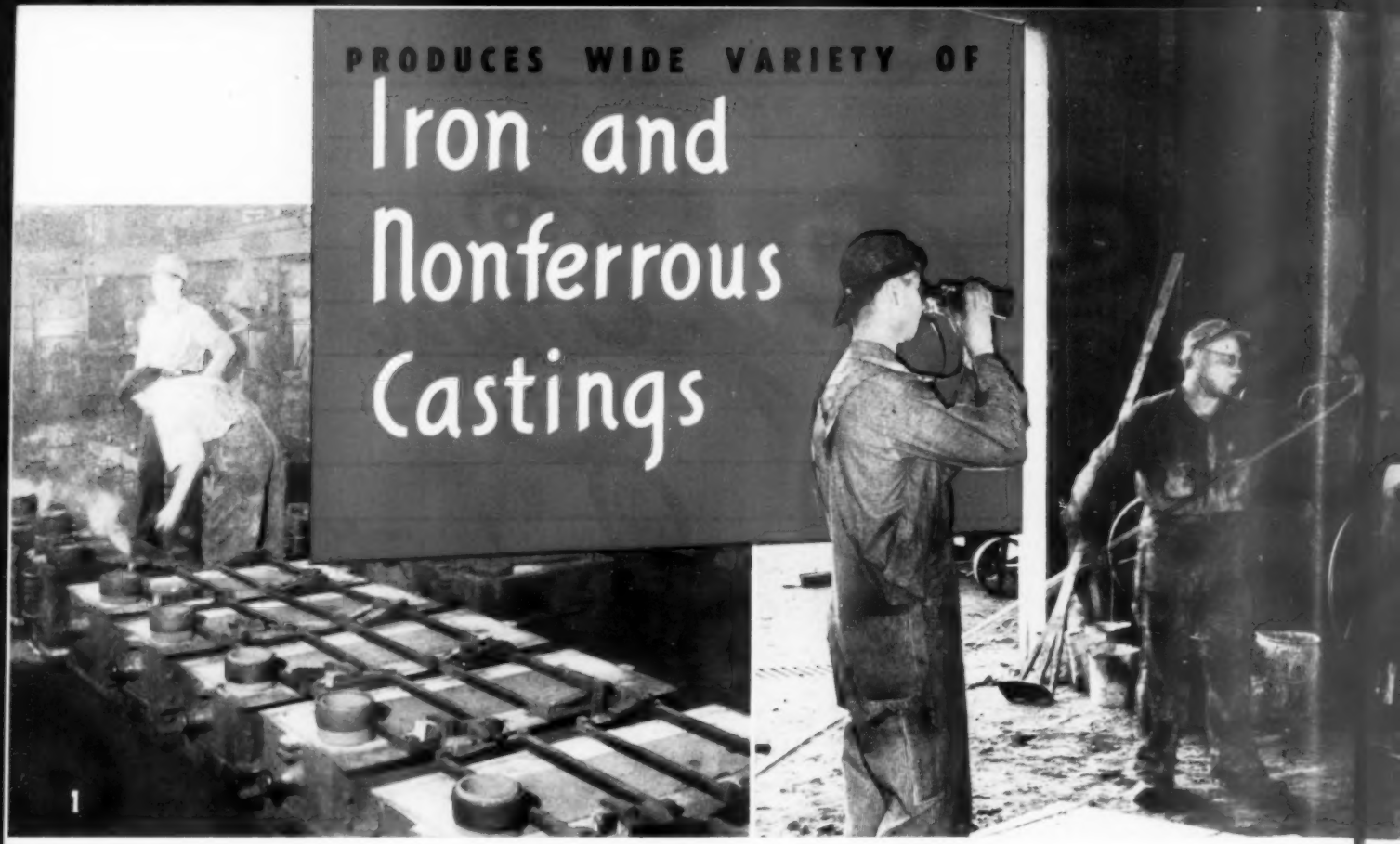
The OPA found that the average profit before taxes realized by 487 gray iron foundries for the base period (1936-1939) was 4.0 per cent of sales. The percentage rose to 5.9 per cent in 1940 and stood at 8.8 per cent in January, 1942, the last period for which figures are available.

While the 4 per cent base period profit percentage before taxes is less than the return on high grade bonds, the holding of which entails practically no risk, it was nevertheless in line with average profits of all industries which were a point or two lower still. The comparison of bond yields with gross profits on sales is valid because foundries normally turn their invested capital about once a year.

Pricing Policies — 393 foundries reported selling gray iron castings on a *per pound* basis, while 363 foundries reported selling on a *per piece* basis. And 116 foundries reported selling according to price schedules of standard weights and quantities. There is some duplication in these figures, indicating that some foundries use more than one method of pricing their product. It is be- (*Please turn to page* 138)

PRODUCES WIDE VARIETY OF

Iron and Nonferrous Castings



Products of the Paxton-Mitchell Co. include both iron and copper-base alloy castings for various uses, and operating practice incorporates both static and centrifugal casting methods

By GERALD E. STEDMAN

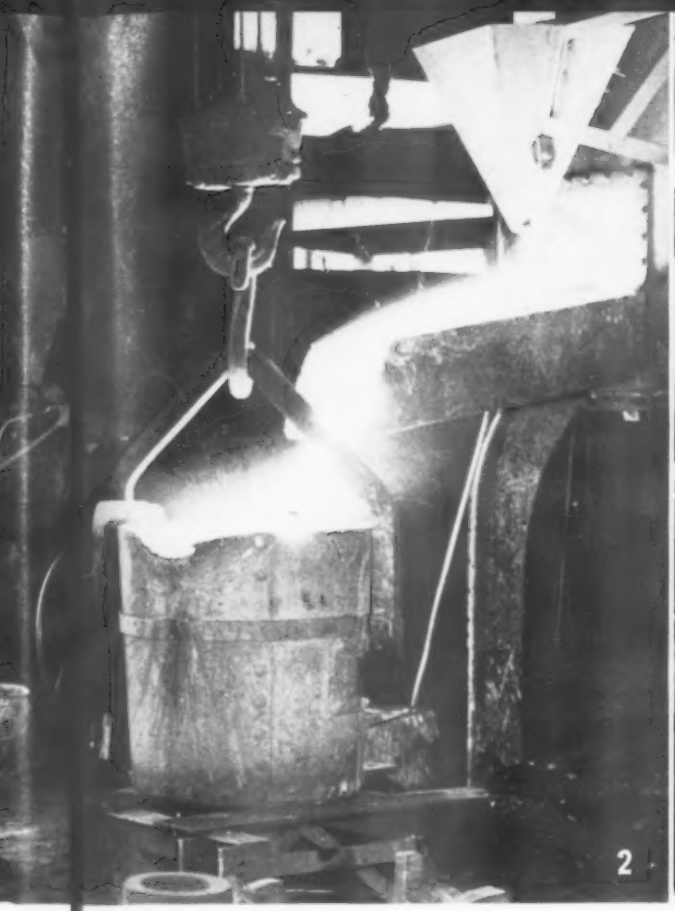
PAXTON-MITCHELL CO., Omaha Nebr., began making metallic packing in 1900. A few years later the company expanded its facilities to include ferrous and nonferrous foundries, pattern shop and a general machine shop. In addition to being a large producer of full metallic piston rod and valve stem packing for reciprocating steam engines, the company casts and machines a wide variety of gray iron and nonferrous castings for locomotive, marine, diesel and internal combustion engines, and automotive refrigeration and miscellaneous uses. The present description is confined to the foundry.

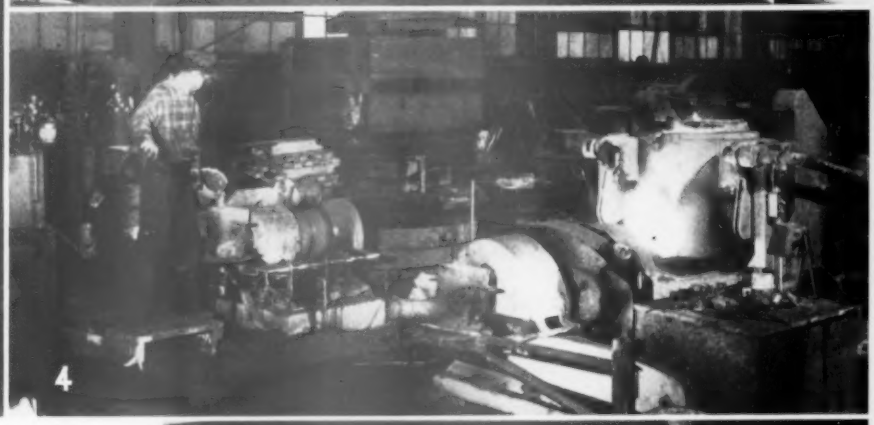
Two cupolas of 42-in. inside diameter, mounted side by side and charged by skip hoist, melt the average daily iron heat of 25 tons, resulting in an approximate yield of 67 per cent good castings. Each cupola is used on alternate days. In the main bay, 50 x 60-ft, miscellaneous and short order jobs are made on five floors. Majority of the molds are made on five jolt rollover machines. The entire bay is served by two 5-ton capacity electrically operated traveling cranes. Each machine floor is served by 1½-ton capacity electrically operated traveling crane. These cranes are provided with pendent control operated from the floor. Fly wheel castings up to 1200 and 1300 lb are made in this section of the foundry.

Cupola charges for many castings contain from 10 to 45 per cent steel. Special properties in certain iron castings are developed by alloying with suitable amounts of chromium, nickel and molybdenum. The alloy is placed in a small metal hopper over the spout of the cupola and is fed in accurate amount into the flowing stream.

A 50 x 100 ft squeezer bay floor off the end of the main bay is equipped with seven molding machines from which the output for each machine is approximately 1500 lb of castings per day. Metal on this floor is distributed by a 1-ton capacity teapot type ladle suspended from a manually controlled crane.

Bronze and iron cylinder liners and other castings of the same general type from 3 to 18-in. diameter and up to 38-in. in length are produced in centrifugally operated machines. Nonferrous metals are melted in an oil-fired tilting furnace, capacity 1200 lb. Depending on the size of the casting, metal from a crane or hand ladle is poured into the pouring basin outside one end of the machine. Obviously, by pouring the same weight of metal each time into the





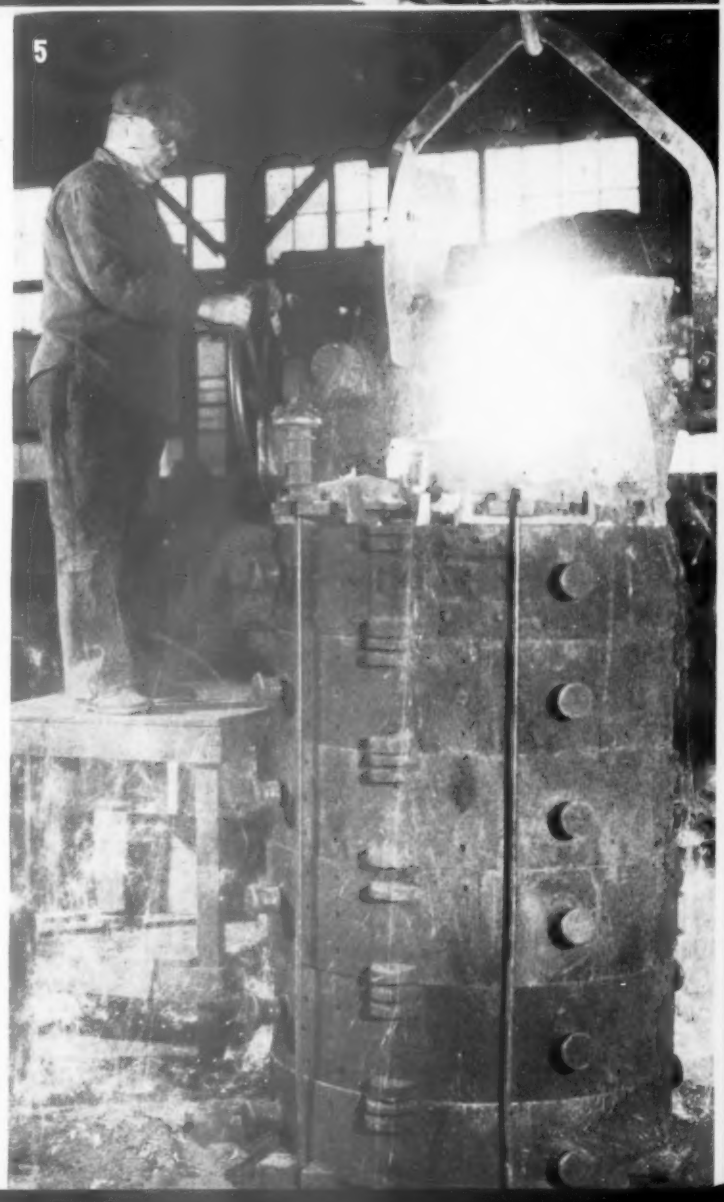


Fig. 1—View in north bay showing one molding floor

Fig. 2—Tapping the cupola, with alloy being added to the molten metal from small hopper over the spout

Fig. 3—Melting and pouring room for nonferrous metals. Ventilating hoods cap furnaces and pouring station

Fig. 4—Centrifugal machines for casting ferrous and nonferrous metals

Fig. 5—Pouring locomotive cylinder liner in sectional mold

basin, the resulting castings will be duplicates in inside and outside dimensions and in wall thickness. While the temperature and composition of the metal must be watched closely, the speed of rotation is the most important factor in the centrifugal casting process. This may vary from a speed of 400 rpm for the larger castings up to a maximum speed of 1600 rpm for the small castings. Small castings are extracted by hand from the molds. Large castings are pulled out by an air jack. Before it is placed in service, the face of the mold is coated with a mixture containing silica flour and bentonite. The facing material is dried in an oven.

In addition to a wide range of miscellaneous castings, the nonferrous foundry also supplies all the matchplates required in the different foundries. Although a certain amount of care and skill is required, the technique involved in the production of a matchplate casting is comparatively simple. Cope and drag, a little larger than usual, are rammed in the usual

manner. The cope is lifted off and a frame, in one piece or in sections ⅜-in. thick, is placed on the drag face. The frame controls the shape and size of the desired plate. The joint face of the drag is covered with rammed sand and scraped off flush with the upper face of the frame. The frame is removed, the pattern lifted out and the cope replaced. It will rest on the new sand bearing in the drag, ⅜-in. above its former position. The result is a plate ⅜-in. thick with the drag impression of the original pattern on one side and the cope impression on the opposite side.

Molds for metallic packing segments move toward the pouring area on a roller conveyor. An elaborate suction system over the entire melting and pouring area eliminates the hygienic hazard present where a 50 - 50 mixture of copper and lead is involved. The metal is melted in an 800-lb capacity barrel type furnace. The furnace has a unique rocking device in constant motion. The charge is melted by a single gas or oil burner at one end of the furnace. It is claimed these furnaces will melt 125 heats on a single lining. The lining is patched and repaired while the furnace is idle on Saturday.

Pouring temperature of the metal is between 1950 and 2000° F. A crucible holds enough metal to pour five castings. While still on the conveyor, the molds are returned to the machine molding floor where they are shaken out. Sand from the shakeout and new sand from the sand storage is carried to the sand preparation station and later to the various molding stations in boxes 2 x 2 x 4 ft mounted on trucks. Short belt conveyors feed sand to the core blowing machines.

New molding and core sand arrives in box cars over a railroad siding and is discharged into storage bins with a total area of 40 x 200 ft. The principal core sand mixture includes 3 cu ft silica sand, 3 qt cereal binder, 1½ qt core oil. A second mixture contains 1½ cu ft local river sand, 1½ cu ft imported silica sand, 4 qt cereal binder, 1½ qt core oil. Sand for the core blowing machines is made up in batches containing 3 cu ft silica sand, 2 qt cereal binder, 2 qt core oil and 1 pt kerosene. The core making machines produce cores varying in weight from ¼ to 150 lb. Dry sand core molds are used for making many castings, especially those subjected to high pressure.

With approximately 250 employees the company's labor turnover is 8.75 per cent and would be less but for the night shakeout gang. Absenteeism averages about 4 per cent. Lost-time accident rate has been under 13 per million man-hours. Supervision ratio is 1 to 14. Installation recently of a guaranteed base rate and bonus incentive plan in the iron foundry and coremaking departments has increased production in some instances as much as 100 per cent, it is said. Close attention is paid to safety rules and devices; for example, a strict rule applies to the wearing of safety glasses, which are furnished by the company.

During the recent war the Paxton-Mitchell Co. received the Maritime "M" award for excellence in production. This award was repeated on four occasions.

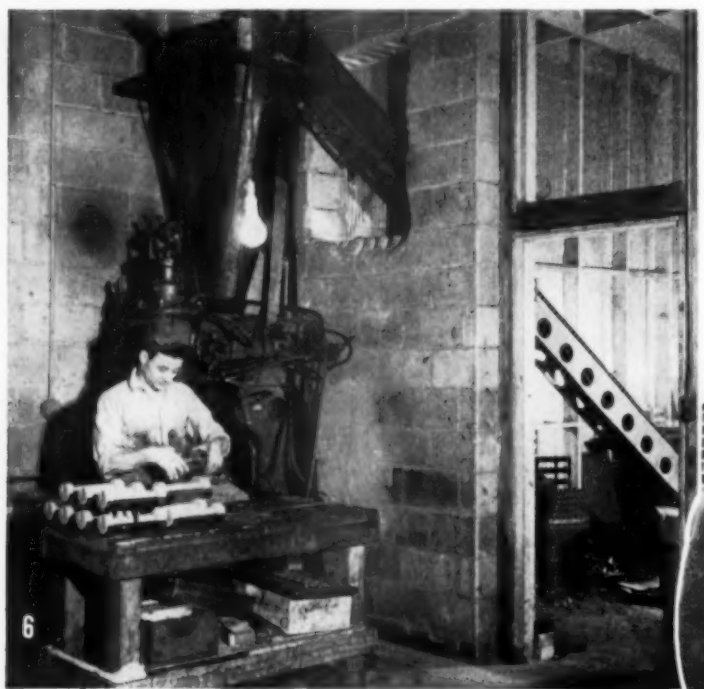


Fig. 6—Core blowing machines are equipped with elevator to supply sand

Fig. 7—P. A. Moluf, plant superintendent; Earl White, foundry superintendent; and J. L. Paxton Jr., president and general manager, (left to right) inspecting compressor castings

Foundry Sand—Uncontrolled

By HAROLD E. HENDERSON
Sand Technician
H. C. Macaulay Foundry Co.
Berkeley, Calif.

MANY iron jobbing shops which produce a wide variety of casting shapes and sizes, have common problems. Among these is that of sand— uncontrolled! Of course, if the reader desires to be critical to the letter, he might insist that we never have our sand under complete control. And I would be among the first to agree with him.

As far as I have been permitted to observe, sand control is obtained only partially—never wholly. We control our sand in direct ratio to the intelligence we exercise in its segregation and care. And, of course, intelligent care is impossible without adequate equipment.

In a shop where the work is highly specialized, where one type of casting is molded to standards developed for repetitious work, and other conditions are held to a merry-go-round monotony —there it may be possible to more nearly approach the ideal of ultimate sand control.

However, it is not the aim of this paper to discuss the methods of sand control of a repetitious shop. We, as jobbing men, have troubles enough of our own, and our purpose here is to discuss incidental problems which are directly related to our sand. Charlie Schureman once said that there is no panacea for sand trouble, no magic formulae that can be sold in a bag or drum, guaranteed to cure all of our ills.

With all due respect to scientific achievement, foundrymen will continue to learn the hard way—the way of trial and error. We seemingly must make bad castings in order to learn how to make good ones. It has never been done any other way! All foundry practice is based on this ancient formula.

The foundryman whose mental growth has not been retarded or completely arrested, when convinced that his growing scrap pile is unquestionably the result of sand failure, will waste no time in holding an inquest over the dead castings, in an attempt to determine the cause of death. He will go further than this. When assuming the role of detective or doctor, he will endeavor to establish the conditions under which the crime was committed and also the identity of the perpetrator. From here on his work is of a corrective nature, in the hope of preventing a repetition of the crime. Again I must turn to Charlie Schureman for another nugget of advice: "Don't worry too much about the new things; learn to do the old things right!"

The Vicious Circle—The foundry with which I am associated had operated on a natural-bonded sand basis for 35 years, and produced large quantities of good castings during most of those years. Our molders were for the most part highly skilled, and our helpers knew how to *cut* sand with a shovel and properly blend it into a workable heap. Those were the good old days! Of course, at times there was too much new sand per floor, and then we would have an epidemic of scabs, blows, rat-tails and gas-holes; or we might forget all about new sand for a couple days, and then we'd be sure to have cuts, washes, drops and swells: But they didn't know what a buckle was—or so they tell me.

That was the story for 35 years, and it might have continued if World War II hadn't messed us up. Our 36th year was 1942, and it was not a happy new year. Our older molders were about at the retirement age, and the boys who had been trained to replace them were taken by Uncle Sam. Our best helpers had left for the shipyards, for some silly reason—more money, I believe—and our plant, like hundreds of others, found itself at the mercy of Uncle. In one breath he told us that foundry products were of secondary importance to the prosecution of war, and that labor (*Please turn to page* 230)

Test Bars Show Internal Chill

Q.—We are sending to you sections of a chill test bar and coupon which show an internal chill, and we would like to have an explanation of the occurrence. This is the third time in 25 years we have observed such a condition. All test bars in the heat showed this unusual state of affairs, and yet the castings, as on previous occasions, were satisfactory as to the chill portion and the gray machinable portion. Therefore, we are assuming that the internal chill is due to the manner of pouring or molding the test bars which are poured against a steel chiller in a green sand mold. The cylindrical coupon is not in contact with the chill block, but is surrounded by green sand.

Questions and Answers

A.—The internal or inverse chill phenomenon exhibited by the specimens, fortunately, is one that does not occur frequently, as indicated by your experience. Also you are luckier than others who discover it in the castings rather than in test specimens. From time to time a number of theories have been submitted as to why inverse chill occurs. For example, Scheil, Ruff and Schulz (Archiv fuer Eisenhuttenwesen, 1933-34) suggested that it was due to surface oxidation during pouring. In 1937 Alfred Boyles in his paper "Freezing of Cast Iron" mentions that hydrogen caused normally gray iron to freeze white. Hence, it is quite possible that instead of oxidation mentioned by the German authors, the actual cause is absorption of hydrogen or moisture.

Since your trouble appeared only in the test specimens it possibly was due to use of a ladle which was not dried out thoroughly, while your castings were poured from ladles which were.

Permanent Molds for Aluminum

Q.—We have a request for several thousand aluminum cement block pallets which we wish to cast in a permanent mold. Pallet is 18 in. square, ¼-in. thick with ⅛-in. thick rib around the outside ¼-in. wide, and another ¼-in. rib 2½ in. from outside. Can you give rough sketch of gating? Should the job be cast vertically or on tilt? What is a suitable aluminum alloy for the casting?

A.—Production of a flat plate 18 in. square and ¼-in. thick by the permanent mold process is not going to be an easy matter, and it is suggested that you submit your problem to experts in that field unless you want to spend considerable time and money to develop a suitable mold. It would be our opinion that with such a wide area to cover with the thin section involved that the best procedure would be to cast the plate horizontally, mounting the mold on trunnions so that it can be tilted. At the beginning of the pouring operation the gate end would be considerably below the horizontal or level position, and as the metal stream is held steady to the sprue, the mold is gradually tilted back until the gate end is above the horizontal.

Sprue should be located at the center of one end with branches extending parallel to the edge of the casting cavity. From the branches a number of wide flat gates lead to the cavity. Possibly it might be better to gate all the way across instead of using several gates. In that way a sheet of molten metal the full width of the casting cavity would flow in as the mold is tilted. A slight nick along the edge of the casting cavity could be made to form a guide line to indicate where the gate should be sawed off. We believe that the 5 per cent Si and 95 per cent Al alloy probably will serve since it has good casting properties for thin section work. It also resists corrosion to a considerable degree. However, if the cement blocks are quite wet when placed on the pallets, considerable alkali corrosion will occur.

Sand Is Low in Bonding Power

Q.—Recently we have taken over a brass foundry and find that one of the troubles is defects due to sand conditions. Work is all small, and the sand is used six times per day. We are using a screen-belt type mixer, and have tried adding a little bentonite with the Albany sand which is supposed to be No. 1, but it is too weak even then and soon dries out, causing sand washes. We are expecting some new sand with a 14 to 18 per cent clay content, but will not receive it for a month or so. In the meantime we would like some suggestions to remedy our trouble.

A.—As you have indicated to your own satisfaction, your trouble is due to lack of binder in the sand, and the remedy of course is to add sufficient to bring it up to the desired point. However, it will have to be a cut and try proposition without equipment to determine the amount present. Probably from long usage and lack of proper additions of new sand, the present material is full of fines. You mention that you have tried additions of bentonite, and it should be pointed out that the low moisture content employed with that material appears to show drying out much quicker than when fireclay is used. However, the reason is because a loss of 0.5 per cent moisture from a total content of 2.5 per cent is a 20 per cent loss while the same from a total moisture of 6 per cent is only 8 per cent, or about one-third.

Usually the use of bentonite requires sand control equipment to obtain the greatest benefit and uniform results, and we believe that you will find that fireclay additions probably will be better for your particular conditions since you will have a wider range of clay additions as well as moisture content. Perhaps the easiest way for you to handle the situation would be to take a pile of sand sufficient to make a number of molds and make clay additions to it until your requirements are met. Then the rest of the sand could be given the proper addition. Possibly you may have to add some coarse sand also to open up the heaps.

While you mention that you are using the sand six times a day, we wonder if you are adding sufficient moisture before reuse. It is quite possible that there might be a little carelessness at that point, resulting in a sand too dry for the particular conditions. Hence, it might be well to check that phase, adding a little more water and see what results are obtained.

Casting Design Causes Cracks

Q.—We are sending to you a cast iron bearing housing cap for a 3½-in. shaft which after partly machining, cracked in two or three places. Can you tell us what caused this?

A.—While a number of possibilities, such as too hard a core or too stiff a mold, might be the cause of the cracks in the bearing cap, it is our opinion that the primary fault lies in design of the piece. The central section, which might be called the backbone, is at least 1 in. thick and joined to the side flanges which are about 1 in. thick with comparatively thin webs 5/16-in. thick. The extreme difference in cooling rates between the thick and thin sections sets up an internal stress in the casting. This stress may be relieved sufficiently through self-annealing so as not to result in cracks when the iron is poured hot and the castings allowed to cool in the mold.

Under other conditions, such as the iron not being so hot, shaking out while the castings are still hot, use of hard cores, mold too stiff, etc., the internal stress may be aggravated, and the cracks will appear before or during the cleaning operation. It appears to us that by changing the design so that the backbone is not much thicker than the webs, trouble from cracking will be overcome, not to mention that considerably less iron would be required. You also could core out the bolting lugs, and use cores in the flanges to form the grooves which now are machined. Such changes would provide a casting with a more uniform metal section.

Making Small Cast Iron Rolls

Q.—We have a small electric arc furnace of 500 lb capacity and would like to know the best chemical composition for small rolls for making corrugated bars. We also would like information on the best procedure for making the rolls. Should they be chilled, and poured vertically or on the flat?

A.—Small rolls such as you mention usually are made of gray iron, and a wide variety of compositions are employed by firms specializing in such work. Presumably your mention of rolling corrugated bars means that the rolls will have some type of indentation or impression on the face to provide raised sections on the bars at regular intervals. Hence, the rolls cannot be made in chills since the latter would have to be split vertically and the joint would tend to leave fins on the roll surface. If the roll must have a chilled surface, you will have to go to an iron containing about 4.5 per cent Ni and 1.6 per cent Cr with a low Si of 0.40 to 0.60 per cent.

Composition for rolls varies widely from maker to maker, including different amounts of nickel, chromium, molybdenum, vanadium, etc. For example, one composition shows about 0.60 per cent Si, 2 to 2½ per cent Ni, 0.75 to 1.1 per cent Cr, and 0.25 to 0.35 per cent Mo. Another shows 1.75 per cent Cr, 1 per cent Si, and 0.20 per cent V.

Rolls usually are poured in the vertical position, the metal entering through a gate at the bottom, and set tangentially so that the metal swirls or spins around as it rises in the mold. Top portion of the mold is extended for some distance above the desired length of the wobbler to provide a feeding reservoir. Usually the mold is filled from the bottom to a point just above the actual length of the wobbler, and then hot metal is poured into the riser to insure good feeding. With a small roll such as you intend to make, it may be molded on the side in a flask with a suitable opening at one end for the riser extension, and another on the sides at the bottom for the attachment of the sprue — unless the flask is large enough to include the sprue.

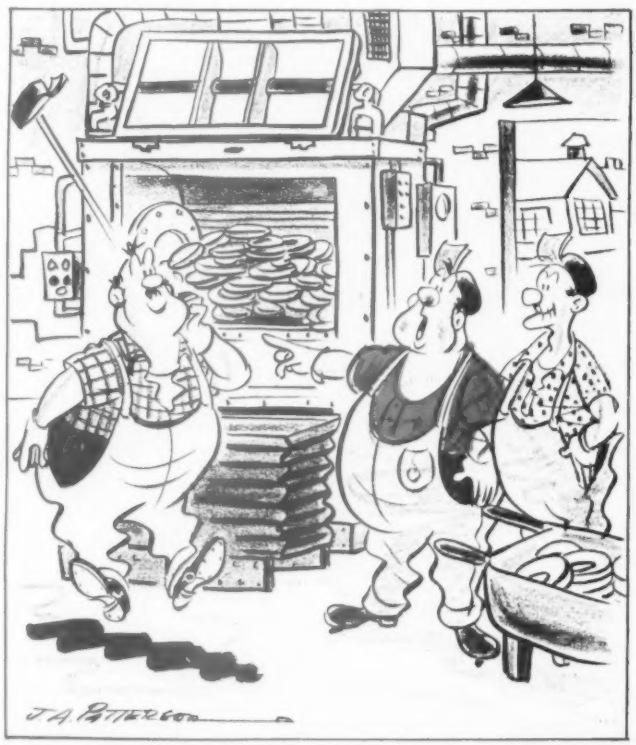
Melts Cold in a Small Cupola

Q.—In our 20-in. diameter cupola, four tuyeres 4 x 6-in. are 15 in. above the sand bottom. The bed coke, 275 lb, is allowed to burn from 1 to 1½ hours before the blast is put on. The first iron charge weighs 400 lb. Succeeding charges are 100 lb with 12 lb coke splits. Blast is supplied by a blower running at 2100 rpm. The first iron appears in about 4 minutes and is tapped 5 minutes afterward. This iron, and the iron all through the heat is too dull to use. We shall appreciate advice on the proper method of operation.

A.—The fact that the first iron appears in 4 or 5 minutes indicates that the coke bed is too low. The exceedingly heavy initial iron charge, 400 lb, reduces the bed still further. The remaining charges of 100

GANGWAY!

By J. A. PATTERSON



"He claims he left his uppers in that last batch to be cleaned and wants to know are they ready yet"

lb iron and 12 lb coke are all right in themselves, but they are not sufficient to raise the bed to the proper height. Running at 2100 rpm your present blower has a rated capacity of 300 cfm at a pressure of 3 to 4 oz. For efficient operation the cupola requires about 500 cfm at a pressure of 6 to 7 oz.

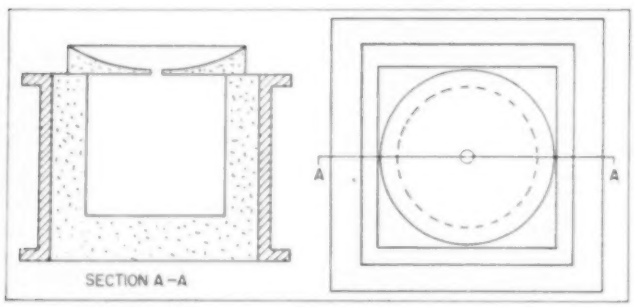
The coke bed should extend approximately 40 in. above the tuyeres. This means after it has burned through and has settled down. Add enough coke at this stage to bring the level to the proper height. A handy gage is a light steel rod with a toe bent at each end. The upper toe rests on the sill of the charging opening. The lower toe rests on the upper face of the coke bed. Although practiced to a limited extent, the majority of foundrymen do not favor a heavy initial charge. Begin with your present charge of 100 lb iron and 12 to 15 lb coke. Make minor adjustments for a few heats until melting conditions are perfectly satisfactory. Increase the speed of the blower to 2900 rpm to get the proper blast volume of 500 cfm at a pressure of 6 to 7 oz.

Use Small Riser To Feed Slug

Q.—What is the most approved method of gating and risering a solid gray iron cylindrical casting 12½-in. high, and 12½-in. diameter. This casting has to be clean and solid all the way through. Do you thing the mold should be dried?

A.—Taking the second part of the question first, it is not necessary to dry the mold for a cylindrical slug 12½ x 12½-in., provided, of course, the sand is rammed properly, a little harder around the bottom than around the upper part. This is to anticipate and prevent a slight swelling or strain when the mold is filled. The usual draft on the pattern will offset the strain. With a coarse, open-grain sand, no venting is necessary. With a close grain sand it is advisable to run a row of vertical vents around and approximately 1-in. away from the pattern. This treatment will allow the metal to rise quietly in the mold without any kicking, boiling or fluttering.

The most approved method of gating and risering the casting is that practiced in a prominent midwest foundry and mentioned as a feature in a description



Mold cavity is covered with a core

of the foundry published in THE FOUNDRY several years ago. In this shop the slugs, 12-in. diameter and 24-in. in length, are molded two in a flask and poured as a unit. However, that is only a detail. The method is the same whether one or two molds are made in the same flask or in a hole in the floor.

Application of the method and principle is shown in the accompanying illustration. In the machine shop. The slug is cut into various size disks and rings and obviously must be clean and solid. The desired result is secured by covering the mold cavity with a dry sand core containing a depression or basin. A small opening ¾ or 1-in. diameter, forms a connection between the bottom of the basin in the center and the top of the casting. At this point the sand is between ¼ and ½-in. thick. Metal is poured into the mold through a gate near the top in the usual manner. Pouring is stopped when the rising metal touches the dry sand core. The basin then is filled with fresh, hot iron which naturally is at a higher temperature than the metal in the mold. The surface is covered with a handful or two of good insulating material in powdered form and no further attention is paid to it. In the cleaning room the narrow connection is easily broken and removed.

Melts Iron for Thin Sections

Q.—We are arranging our foundry to pour a large quantity of small thin iron castings about 3/16-in. thick and 8 in. in diam. Some are flat plate and others are similar to the base piece of a standard No. 2 pitcher water pump. Our sand appears right as a few trial castings show a fine finish. Our main question is on cupola practice which will result in a higher percentage of good castings. Cupola is lined to 30 in. and we would like to know the charge weights for coke and iron, best pouring temperature, and what material we should use to make the iron as fluid as possible. At present we are using only pig iron containing 1.70 Si, 0.033 S, 0.72 P and 0.35 Mn. Scrap used is our own gates. Coke is 3 x 5 in.

A.—With your cupola lined to 30 in. we believe that you will obtain more uniform and better results by using small coke splits and iron charges, and for that reason we suggest that you employ 65 lb coke with 520 lb iron. This is a ratio of 1 to 8 and should result in good, hot iron. Start with a bed about 40 in. deep, and make the necessary adjustment up or down until the best operating results are obtained. It is difficult to say what would be the best pouring temperature for the castings since it can only be determined by experiment. Try the iron as it comes from the cupola, and if it is too hot for the castings farthest from the cupola, increase the melting ratio to say 1 to 9; conversely if the iron is too cold you will have to decrease it to 1 to 7. Remember also that your molding sand condition will have much to do with what temperature you can use for pouring.

It would be our guess that the silicon content of your present mixture is somewhat low for the section thickness of the castings, and we suggest that you try the addition of 0.50 per cent Si to the ladle in the form of ferrosilicon. If 50 per cent ferrosilicon is used, the amount required will be 16 oz per 100 lb iron, while with 75 per cent ferrosilicon only 12 oz will be needed. Instead of ferrosilicon you might try one of the several "graphitizing" type inoculants which are available.

You do not mention just what kind of trouble you are having so it is not possible for us to offer any suggestions to remedy the situation. However, from your remark on fluidity, it might be due to low temperature iron or to the composition of the iron, or perhaps a combination of both.

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DIVISION program-papers committee heads and general interest group chairmen of American Foundrymen's Association reported last month the completion of their sections of the technical program—60-odd specific interest, round-table, lecture and shop course, and "Information Please" sessions, panel discussions and symposia—of the society's Foundry Congress and Show in Philadelphia the week of May 3.

"Castings today" is the theme of AFA's annual meeting of 1948, with one of the largest shows in its 52-year history assured, attendance expected to equal or exceed the 1946 all-time high of 18,000, and timely data on the most efficient high-production operations under current market and personnel difficulties shaping up an unusually comprehensive group of program papers.

Preprints of these papers now are being mailed, sufficiently ahead of convention time to give technologists of the industry an opportunity to study them and prepare written discussions for presentation at the congress. Other industry leaders are preparing to provide direct advice on individual problems to foundrymen in quiz programs sponsored by general interest committees. "Boards of experts" in various aspects of foundry technology will handle written questions submitted in advance, and others raised from the floor at convention sessions.

AFA's Refractories Committee, headed by Richard H. Stone, sales manager of Vesuvius Crucible Co., Pittsburgh, will lead off the round of "Information Please" meetings at one of its two sessions Wednesday, May 5. It will devote the other to "Testing Refractories for the Foundry," by S. M. Swain of North American Refractories Co., Cleveland.

Thursday afternoon, the Cost Committee, of which R. L. Lee, comptroller, Grede Foundries, Inc., Milwaukee, is chairman, will analyze and discuss questions submitted by the industry and concerning individual problems in methods of cost accounting, distribution of costs and application of accounting data.

Another question-and-answer panel, the same afternoon, will be presented by the association's Job Evaluation-Time Study group, which is headed by Robert J. Fisher, supervisor of standards for the Falk Corp., Milwaukee. At a second meeting of the same committee, Dean Van Order, industrial engineer with Burnside Steel Foundry, Chicago, will be featured speaker on "Grinding Standards Help Eliminate Cleaning Room Bottlenecks."

Study Heat Transfer Problems

The Heat Transfer Committee, which drew overflow audiences to both its Detroit sessions last year, has scheduled its four-part progress report for Tuesday afternoon, according to Chairman Harry A. Schwartz, manager of research, National Malleable & Steel Castings Co., Cleveland. Part 1 of the report is "Thermal Conductivity of a Sand Mixture," by C. F. Lucks, O. L. Linebrink and Kay L. Johnson of Battelle Memorial Institute, Columbus, O.; Parts 2, 3, 4, respectively, cover studies of solidification of aluminum castings, white iron castings and steel spheres, by Dr. Victor Paschkis, technical director of the heat and mass flow laboratory at Columbia University, New York.

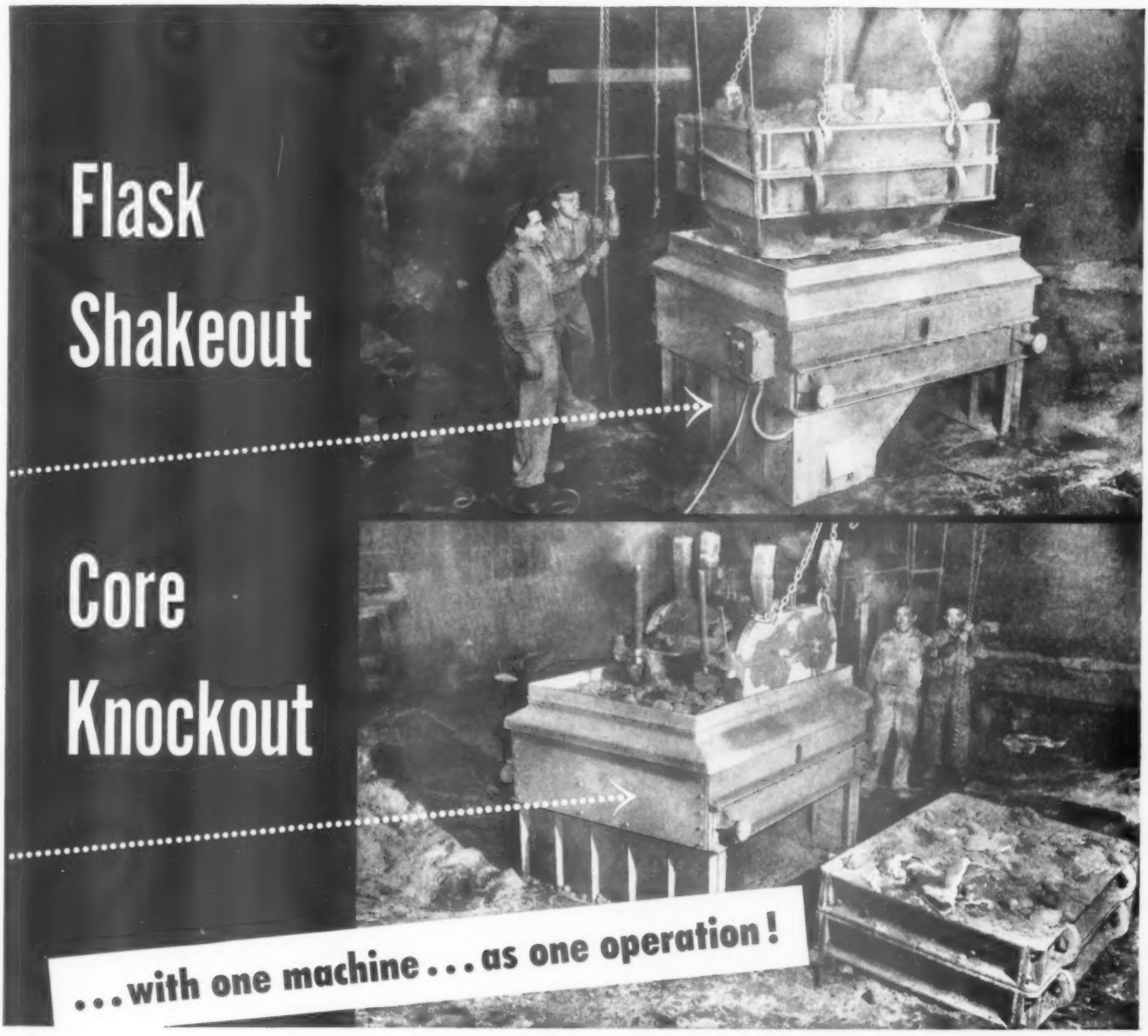
Three instructional lecture courses will offer timely operational data this year: the special series on quality control test procedures—aluminum and magnesium; brass, bronze and nickel alloys; gray iron; malleable iron; steel—sponsored by the Annual Lecture Committee, and the Gray Iron and Sand Divisions' shop operation courses.

Division round-table luncheon plans include discussion of "Melting of Brass and Bronze" at luncheon of the Brass and Bronze Division, Monday, with Herman L. Smith, chief metallurgist of the Federated Metals Division, American Smelting & Refining Co., Pittsburgh, speaker; "Permanent Mold Casting of Aluminum and Magnesium Alloys," by the light metals section Tuesday, and of a Naval Research Laboratory color film on the flow of metal into a mold at the noon session of the Steel Division, Thursday.

Malleable Division round-table will be held Tuesday noon; that of the Pattern Division, Wednesday noon.

Technical session topics, in addition to those previously reported, are announced by the following division vice chairmen:

Manley E. Brooks, foundry engineer, Dow Chemical Co., Bay City, Mich., Aluminum and Magnesium—"Step Aging of a Magnesium-Base Casting Alloy," by G. Sachs and E. J. Vargo, Case Institute of Technology, Cleveland; "Effect of Gating Design on Metal Flow in the Casting of (*Please turn to page* 222)



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MEN of Industry

W. E. JONES, who is serving as chairman this year of the Birmingham District Chapter of the American Foundrymen's Association, is chief engineer, Stockham Pipe Fittings Co., Birmingham. Ned Jones was graduated from Princeton University in 1933 and was associated with Stockham until 1936 when he joined International Nickel Co. as southeastern foundry engineer. Returning to Stockham in 1938 as chief metallurgist, he was made chief engineer in 1940. His connection with the company was interrupted in 1944-45 when he served with the Marine Corps. Active for a number of years in AFA chapter activities, he was vice chairman of the Birmingham District Chapter in 1946-47.

♦ ♦ ♦

Fred P. Biggs has been appointed first vice president of Brake Shoe & Castings Division, American Brake Shoe Co., New York. Mr. Biggs attended University of Washington and joined American Brake Shoe Co. in 1916, as sales inspector. He was appointed salesman in 1921, assistant vice president of the company with headquarters in Chicago in 1934, and vice president of the Brake Shoe & Castings Division in 1938. In addition to his new duties Mr. Biggs will continue as vice president in charge of sales for the Brake Shoe & Castings and Southern Wheel Divisions, positions which he has held since 1944.

♦ ♦ ♦

Emil G. Schmidt has been appointed foundry superintendent, Studebaker Corp., South Bend, Ind. Following graduation from Dartmouth College, Mr. Schmidt became assistant foundry superintendent at Allis-Chalmers Mfg. Co., Milwaukee, and at Western Foundry Co., Chicago. For many years he has been in charge of foundry operations for International Harvester Co. He was assistant foundry superintendent at its Rock Island plant for 4 years and later became superintendent of foundries at Indianapolis and Louisville.

♦ ♦ ♦

Robert W. K. Honeycombe is the author of the exchange paper of the Institute of Australian Foundrymen to the 1948 congress of American Foundrymen's Association. The paper entitled, "The Technology of Copper-Lead Alloys," will be presented at a technical session sponsored by the Brass and Bronze Division, at the Philadelphia convention in May. Following graduation from University of Melbourne in 1942, where he earned his master of science degree in metallurgy for work on preparation and properties of tungsten carbide, Mr. Honeycombe joined the Council for Scientific and Industrial Research, Melbourne. While there he was assigned to work with bearings and electrolytic polishing and his development of the difference in the behavior of lead and tin-base alloys brought him widespread recognition. He is now at Cambridge University studying at the Cavendish Laboratory on an I. C. I. Fellowship which he won last year for his work on deformation and recrystallization of duplex brass.

♦ ♦ ♦

John A. Hill has been elected president, Air Reduction Co. Inc., succeeding **Charles S. Munson,** who has been named chairman of the executive committee. **William C. Keeley,** formerly vice president, has been made chairman of the newly created finance committee. **C. E. Adams** remains chairman of the board of directors. Mr. Hill, who joined the company in 1939, became secretary of Air Reduction in 1941 and vice president in 1945. Mr. Munson, president since 1937, joined the company in 1919.

♦ ♦ ♦

W. M. Hamilton, general superintendent, Crane Ltd., Montreal, Que., subsidiary of Crane Co., Chicago, has been transferred to the Chattanooga, Tenn., plant of the company. Mr. Hamilton has been serving as a director of the Eastern Canada-New Foundland Chapter of the American Foundrymen's Association. **John D. Walker** succeeds Mr. Hamilton as general superintendent at Montreal.

♦ ♦ ♦

Ralph L. Wilcox, general manager of the Detroit division, Gerity-Michigan Corp., Adrian, Mich., has been elected vice president in charge of industrial sales and engineering. **W. Waite Broughton,** until recently production manager of the Trico Products Corp., Buffalo, N. Y., succeeds Mr. Wilcox at Detroit. Mr. Wilcox

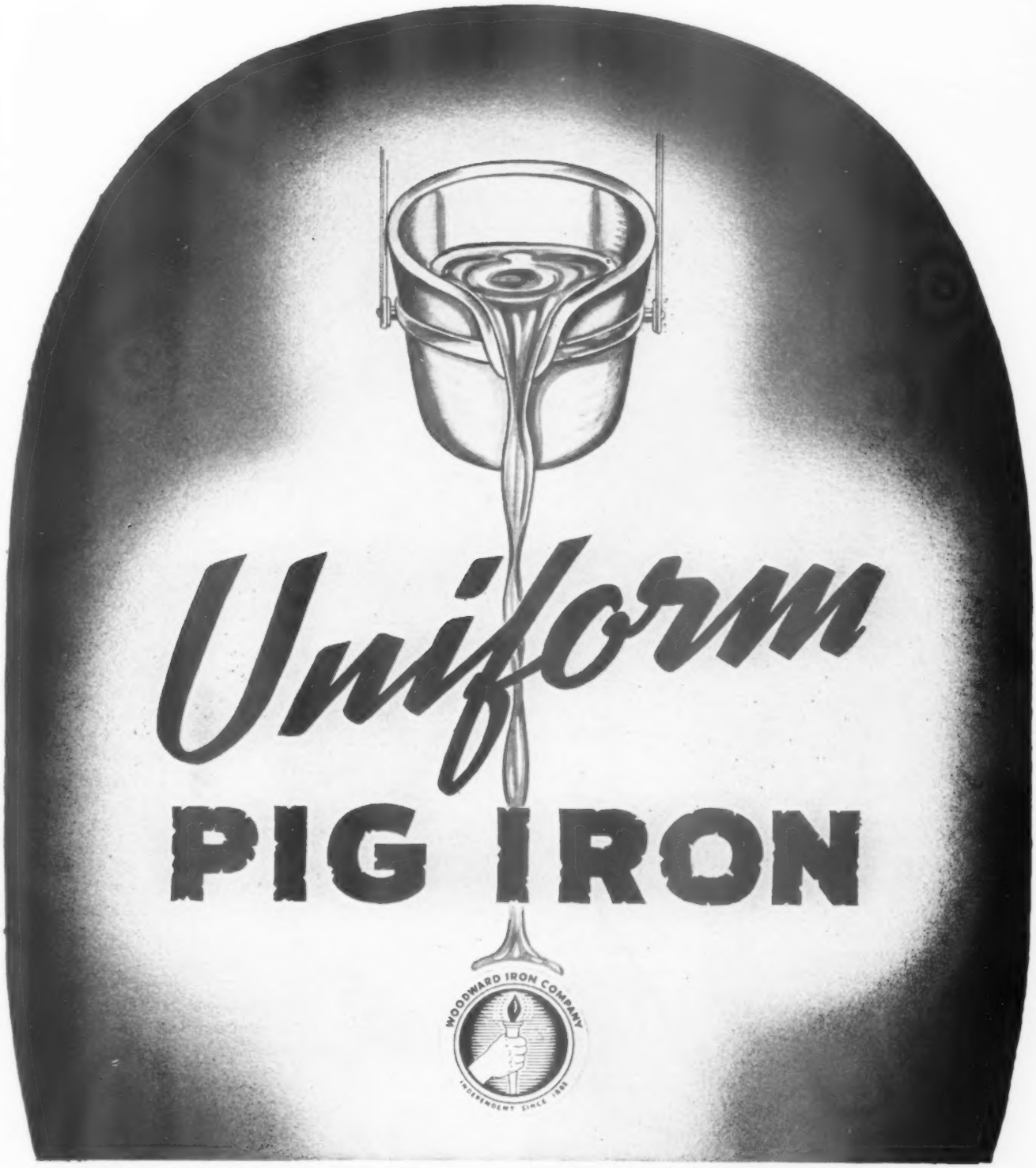
(Continued on page 104)

W. E. JONES

FRED P. BIGGS

EMIL G. SCHMIDT

ROBERT W. K. HONEYCOMBE



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(*Continued from page* 102)

was a technical representative of the New Jersey Zinc Co. for 16 years prior to joining Gerity-Michigan Corp. Mr. Broughton had been associated with National Lead Co. for 8 years prior to his service with Trico, and for many years he was a technical representative with New Jersey Zinc Co.

♦ ♦ ♦

M. G. Sternberg, formerly executive vice president, Continental Foundry & Machine Co., East Chicago, Ind., has been elected president of the company. **H. A. Forsberg, B. P. Hammond** and **A. E. Murton** have been named vice presidents and **K. B. Hall,** a director. Mr. Sternberg has been associated with the company since 1918. He was in charge of production and development of cast armor for Continental during the recent war. Mr. Forsberg, formerly manager of castings sales at the East Chicago plant, joined the company more than 30 years ago and has served as superintendent and manager of operations at East Chicago. Mr. Hammond, for the last 3 years manager of castings sales of the Pittsburgh district, has been associated with the company since 1939. Prior to that he was sales engineer for American Steel Foundries at Verona, Pa., and General Steel Castings Corp., Eddystone, Pa. Mr. Murton, a graduate of University of Illinois, joined the Roll Division of Continental in 1925. He will have charge of roll sales at Pittsburgh. Mr. Hall has acted as legal consultant to Continental Foundry & Machine Co. for many years.

♦ ♦ ♦

M. A. Hunter has been appointed general manufacturing manager, Federal-Mogul Corp., Detroit, in charge of manufacturing operations in company plants at Detroit, Greenville and St. Johns, Mich., Mooresville, Ind., and San Francisco and Fresno, Calif. Mr. Hunter joined the company in 1924, became manager of the Greenville plant in 1940, and was made a director of the corporation in 1946.

♦ ♦ ♦

Thomas Gross, formerly associated with Harnischfeger Corp., Milwaukee, has been appointed plant manager, Beloit Foundry Co., South Beloit, Wis. Mr. Gross has had extensive experience in cupola operation, sand control and core blowing, supplementing his foundry practice with night courses at Purdue University. Previous connections include American Foundry Co., Indianapolis, Delco Remy Division of General Motors Co. at Anderson, Ind., and National Bronze & Aluminum Foundry Co., Cleveland.

♦ ♦ ♦

Raymond J. Perin, of the Ira G. Perin Co., San Francisco, has been elected president of the Materials Handling Association of Northern California. Mr. Perin, a graduate of Stanford University, served with the Goodyear Rubber Co., at its British plant during the war. Upon his return he joined the Ira G. Perin Co., west coast representative for Elwell-Parker trucks.

♦ ♦ ♦

Creston E. Kite has resigned as vice president in charge of sales, General Alloys Co., Boston, and has been appointed general sales manager, Abarry Steel Co., Perth Amboy, N. J. Prior to his association with General Alloys Co., Mr. Kite was a sales executive with E. F. Houghton & Co., Philadelphia, for 20 years.

♦ ♦ ♦

Theodore I. Leston has been appointed vice president in charge of production, Eutectic Welding Alloys Corp., New York. Mr. Leston, a graduate of Arnstadt Polytechnic Institute, completed his metallurgical training at Faculte de Sciences, Paris, and New York University. Specializing in industrial development of high alloy steels, nonferrous metals, silver alloys and other metallurgical products, he was assigned to company projects in the Eutectic research laboratories in 1944, and became director of production last year.

♦ ♦ ♦

Arthur B. Morse has been named vice president and assistant director of sales, Laclede-Christy Clay Products Co., St. Louis, Mo. Mr. Morse, a graduate of University of Southern California, has more than 20 years of experience in refractories on the west coast. Previous connections include Dee Engineering Co., San Francisco, Vitrefrax Corp., Los Angeles, Stockton Fire Brick Co., San Francisco, and with its successor, Gladding, McBean & Co., for the 4 years prior to joining the Laclede-Christy organization.

♦ ♦ ♦

William T. Kelly Jr. has been elected first vice president of American Brakeblok Division, American Brake Shoe Co., New York. Mr. Kelly, a graduate of Yale University, joined American Brake Shoe in 1928 and has been vice president since 1946. He will continue as president of the Kellogg Division and Engineered Castings Division.

♦ ♦ ♦

James Champ has been appointed foundry superintendent, Dill Inc., Rushville, Ind., succeeding **James Meekin.** Mr. Champ has been associated with Davis Foundry Co., New Castle, Ind.

♦ ♦ ♦

Dr. Harry A. Schwartz, manager of research, National Malleable & Steel Castings Co., Cleveland, has been invited to deliver the Edward Williams lecture before the coming

(*Continued on page* 108)

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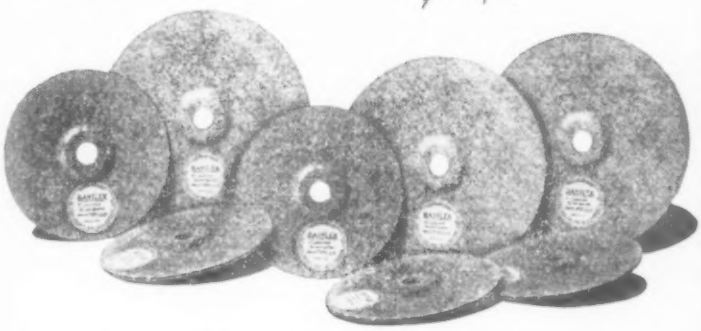

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Unexcelled for cleaning castings.

For welds on angle-iron frames.

For hard-to-get-at places.

Has no equal for smoothing welds.

Hundreds of uses in auto repair shops.

A "MUST" for metal-fabricating shops.

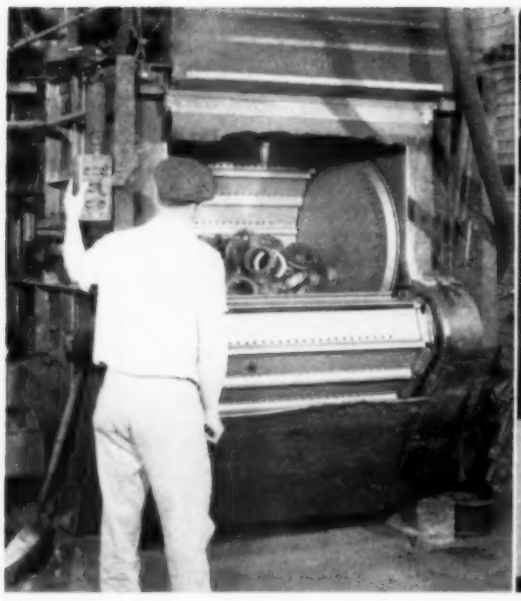
Top Performance Consistently Duplicated

BAY STATE ABRASIVE PRODUCTS CO., WESTBORO, MASS., U. S. A.

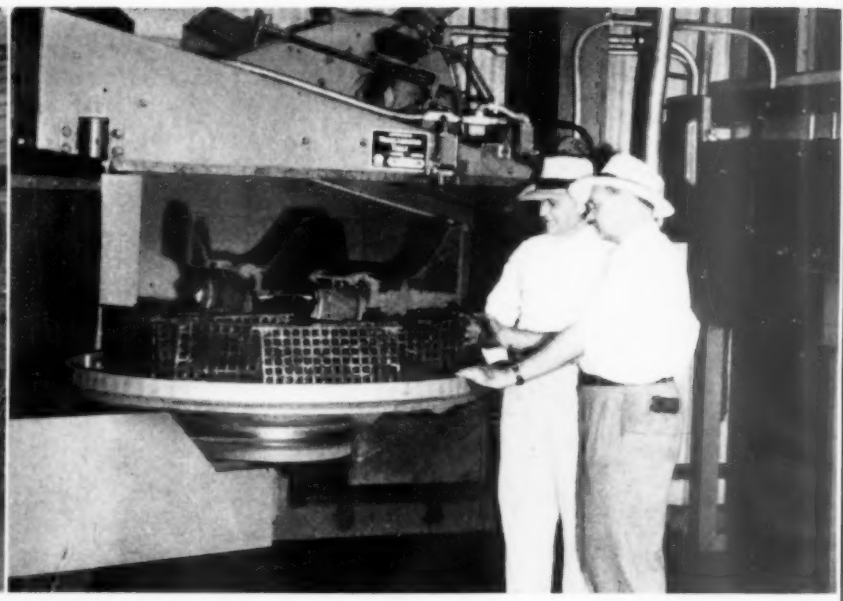
WHEELABRATORS

Stop the Profit Leaks

in Cleaning PUMP



This 36" x 42" Wheelabrator Tumblast, installed at the Blackmer Pump Co., Grand Rapids, Mich., cut 16 man hours daily from cleaning time.



Pump impellers are cleaned in 2½ minutes on this 48" Wheelabrator Swing Table at Arkansas Foundry Co., Little Rock, Arkansas.

The Airless Wheelabrator is helping pump manufacturers to increase their profits because it effects 3-way savings in the blast cleaning of pump parts:

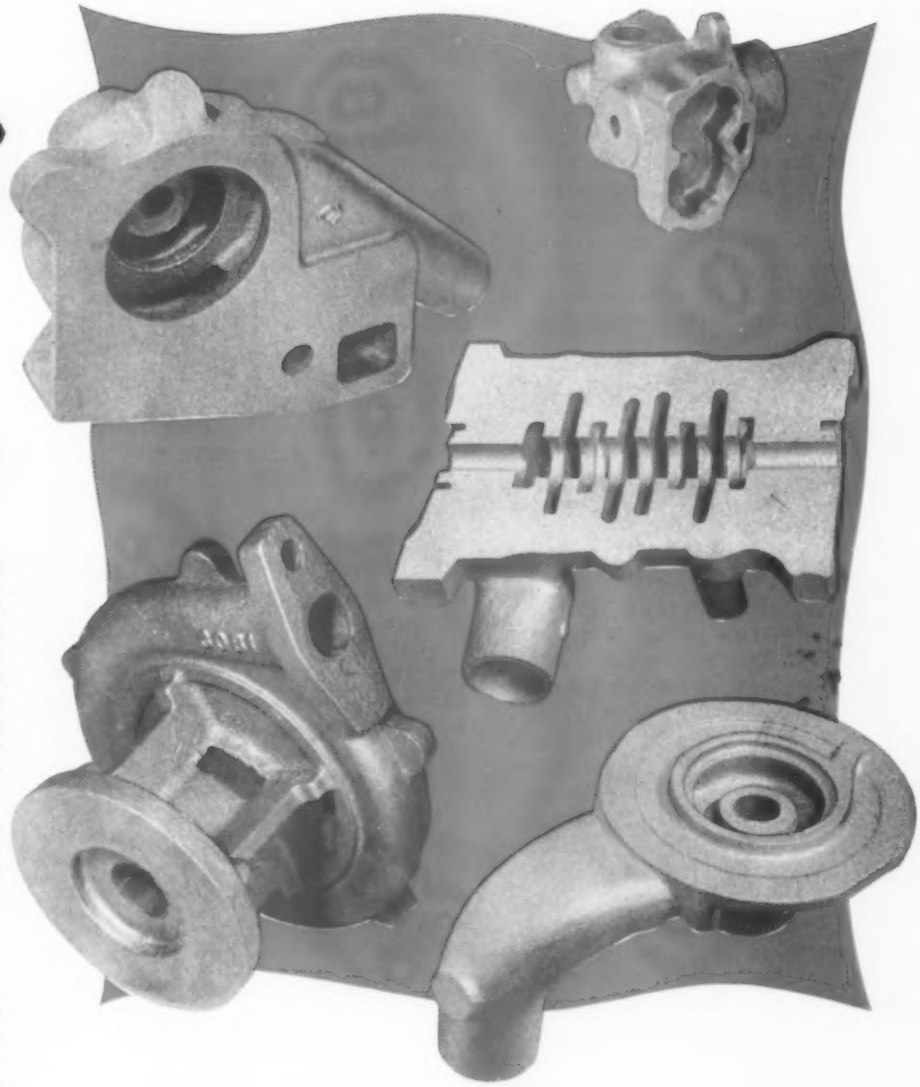
First, by using centrifugal force to hurl the abrasive, the Wheelabrator eliminates many costly and troublesome items of equipment. As no compressed air is required, there is a tremendous saving in horsepower.

Second, its fast cleaning speed and its high production output combine to slash cleaning costs to rock-bottom. Less manpower is required. Hours of cleaning time are saved. Valuable floor space is relieved that otherwise would be needed for extra machines and storage of uncleaned work.

Third, the Wheelabrator cleans so thoroughly that machining and grinding are faster, cutting tools last longer, inspection is simplified, and final finishes adhere in a permanently tight bond. The reason for this is that the Wheelabrator scours away every trace of sand and scale right down to the virgin metal.

WORLD'S LARGEST MANUFACTURER'S OF AIRBLAST EQUIPMENT

PARTS



YOU CAN BANK ON THIS KIND OF PERFORMANCE

A comparison between the speed-cleaning production of Wheelabrator equipment versus airblasting is strikingly illustrated in the case of a 48" x 72" Wheelabrator Tumblast (30 cu. ft. capacity) installed at Oil Well Supply Company, Oil City, Pa. This machine is used for cleaning heavy loads of steel castings which include heavy pump parts with deep pockets and channels. The majority of the work is handled in the Wheelabrator in 10 to 15 minutes time.

According to the cleaning room foreman, they clean more work in 8 hours in a Tumblast than they could possibly clean in an entire week (total of 56 hours) in two humane type sand blast rooms.

• • •

The Hamilton Brass & Aluminum Castings Company, Hamilton, Ohio, uses a 66" diameter Wheelabrator Swing Table for cleaning pump covers, impellers and other castings weighing from 5 lbs. to more than 1000 lbs. each. The heaviest casting cleaned is a pump housing weighing 1350 lbs. Whereas it had previously required 6 hours to clean their production with airblast equipment it now takes the Wheelabrator Swing Table only 3 hours to do the same amount of work.

Mr. Charles E. Kohler, President of this concern, recently wrote as follows:

"In performance, this machine is far superior to any other method of cleaning we have ever used. There is a definite saving in time and cost over previous methods. Your Wheelabrator has proved highly satisfactory and we are more than pleased with the results we are obtaining."

TYPICAL USERS *in Pump Industry*

The Wayne Pump Co.
Red Jacket Mfg. Co.
American-Marsh Pumps, Inc.
Blackmer Pump Co.
Goulds Pump Co.
The F. E. Myers & Bros. Co.
National Pumps Corps.
Gilbert & Barker Mfg. Co.
Ingersoll-Rand, Inc.
Worthington Pump & Machinery Corp.
Fairbanks, Morse & Co.

PUMP PARTS *Being Wheelabrated*

Housings	*Motor housings*
Bodies	*Bearings*
Impellers	*Gears*
Covers	*Valves*
Pedestals	*Plates*
Manifolds	*Pinions*
Shells	*Cranks*
Motor supports	*Rotors*
Liners	*Gear guards*
Vanes	*Cylinders*

Send for this new illustrated booklet devoted entirely to the cleaning problems of the Pump Industry.

American
WHEELABRATOR & EQUIPMENT CORP.
(FORMERLY AMERICAN FOUNDRY EQUIPMENT CO.)
505 S. Byrkit St., Mishawaka 2, Indiana

(*Continued from page* 104)
convention of the Institute of British Foundrymen. The lecture, first delivered in 1935, was established as a tribute to Edward Williams, who had retired at that time from the presidency of the IBF. Dr. Schwartz received the John A. Penton Gold Medal of the American Foundrymen's Association in 1931 and the E. J. Fox Gold Medal of the IBF in 1939. He has been associated with National Malleable & Steel Castings Co. since 1902.

♦ ♦ ♦

W. E. Jones, for the last 4 years representative of National Engineering Co., Chicago, in its Eastern territory, has been transferred to Detroit, to manage the Michigan territory. Mr. Jones was associated formerly with Chrysler's Dodge Chicago Plant, Pontiac Motor Co., Pontiac, Mich., and Campbell, Wyant & Cannon Foundry Co., Muskegon, Mich. **E. C. Troy** succeeds Mr. Jones as service and sales engineer in eastern Pennsylvania, New Jersey, Delaware and Maryland, with headquarters in Philadelphia, where he will also represent Foundry Equipment Co., Cleveland, and International Molding Machine Co., La Grange Park, Ill., in the eastern territory. Mr. Troy has resigned as vice president of Dodge Steel Co., Philadelphia, A graduate of Michigan College of Mining and Technology, he was associated with Detroit Steel Casting Co., Detroit, until 1937, when he joined Dodge Steel Co. Mr. Troy is chairman of the Philadelphia Chapter of the AFA, and is active on many of its national committees.

Frank Jensen, who has been National Engineering representative in Michigan and Ontario since 1936, has been made district manager of the North Central Division, including Michigan, Ohio, Ontario, and Quebec. Mr. Jensen received his early technical training and foundry experience in his native Denmark. He has held positions of foundry superintendent and foundry manager at various large foundries in United States and at one time was consulting foundry engineer for the state planning department in Russia. **Fred W. Fuller,** who has been foundry engineer in Ohio, has been appointed special agent and will concentrate his activities in the northern half of that state. Mr. Fuller will also represent Foundry Equipment Co., Cleveland. He has been associated with National Engineering Co. for over 10 years and received his early training in the foundry industry with Chicago Steel Foundry Co., Chicago.

♦ ♦ ♦

Thomas B. Hasler, formerly president, Wilson Welder & Metals Co. Inc., New York, subsidiary of Air Reduction Inc., New York, has been elected chairman of the board of directors, succeeding **C. E. Adams,** who has resigned. **F. B. Adams Jr.** has been elected president and a director of the company.

♦ ♦ ♦

Leonard P. Rice has been appointed to the metallurgical research staff, Battelle Memorial Institute, Columbus, O. Mr. Rice, a graduate of University of Minnesota, studied later at Notre Dame University. He was formerly a metallurgist with Bendix Products Division, Bendix Aviation Corp., Teterboro, N. J.

♦ ♦ ♦

Charles Locke, formerly chief metallurgist and foundry superintendent for the West Michigan Steel Foundry Co., Muskegon, Mich., has joined the metals research department of Armour Research Foundation of Illinois Institute of Technology, Chicago. Mr. Locke has received degrees from Michigan College of Mining and Technology and Rensselaer Polytechnic Institute. Following graduation from the former in 1936 he was assistant metallurgist at Dodge Steel Co., Philadelphia, for a year and since 1938 had been with West Michigan Steel Foundry Co. **Roy D. Hayworth,** who has been with the metals research staff at Armour since 1946, has been appointed supervisor of abrasion research for the foundation.

♦ ♦ ♦

George Myers has been appointed plant manager, Perfect Circle Corp., Hagerstown, Ind., succeeding **George Keagy,** who has retired. Mr. Myers, who has been associated with the company since 1944, was factory superintendent until last year when he was appointed assistant plant manager.

♦ ♦ ♦

Karl H. Kostenbader has been appointed assistant superintendent of the steel foundry, Bethlehem Steel Co., Bethlehem, Pa. Mr. Kostenbader was graduated from Lafayette College, and received a master's degree from Yale University. He became associated with Bethlehem in 1926.

♦ ♦ ♦

A. N. Phillips, formerly buyer for the Schwitzer-Cummins Co., Indianapolis, has resigned to accept the position as director of purchases for the Stewart-Warner Corp., also of Indianapolis. **G. E. Gertz** succeeds Mr. Phillips at Schwitzer-Cummins Co.

♦ ♦ ♦

Robert Hague has been elected secretary-treasurer of the Wilmington Casting Co., Wilmington, O., succeeding the late Emery R. Bales.

♦ ♦ ♦

Thomas W. McCausland, president, **James Lees,** vice president, and **N. H. Slonaker,** secretary-treasurer of Hyde Park Foundry & Machine Co., Hyde Park, Pa., have resigned during recent reorganization of the company.

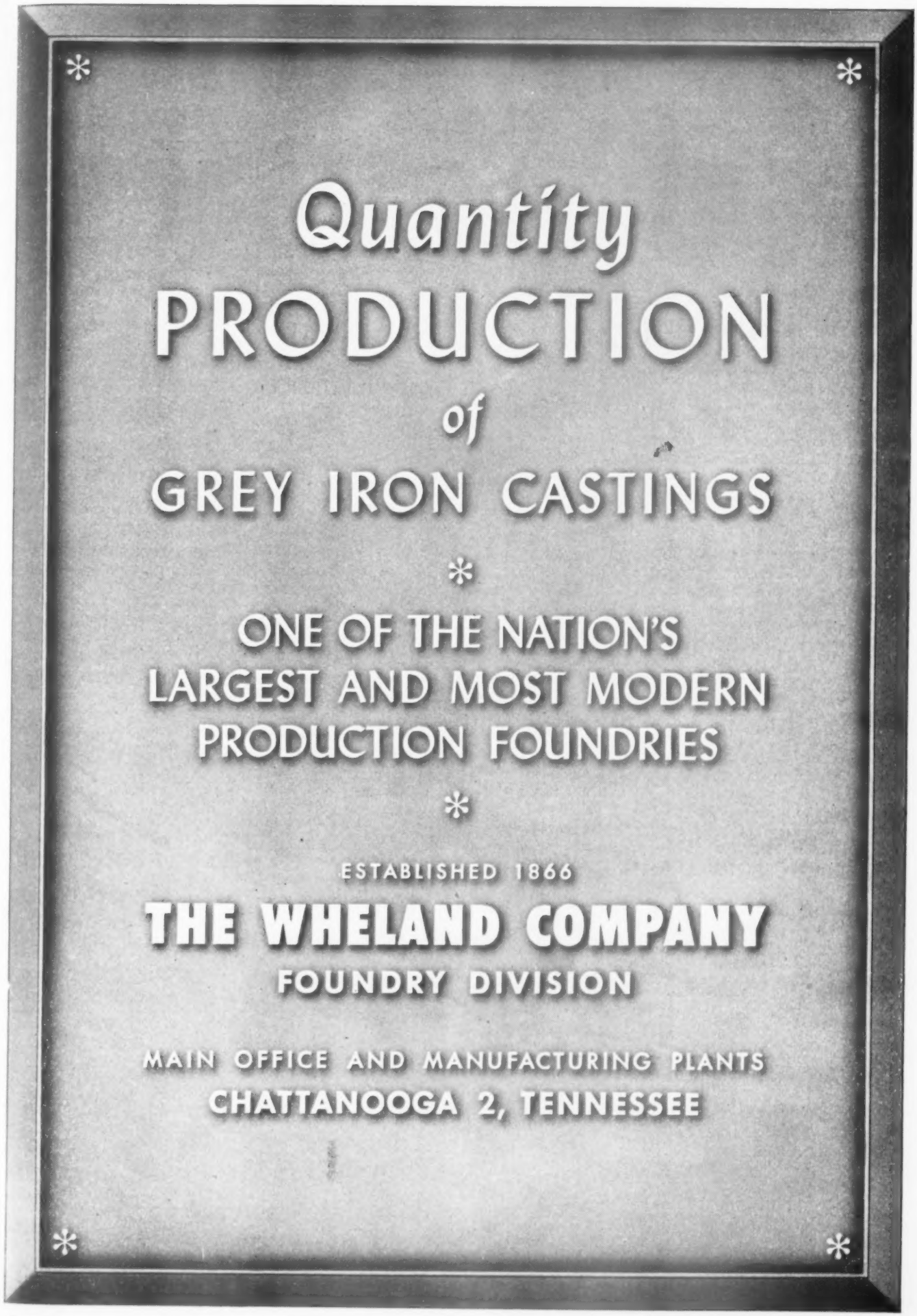
(*Concluded on page* 110)

FRANK JENSEN

W. E. JONES

FRED W. FULLER

E. C. TROY


Quantity
PRODUCTION
of
GREY IRON CASTINGS
ONE OF THE NATION'S
LARGEST AND MOST MODERN
PRODUCTION FOUNDRIES
ESTABLISHED 1866
THE WHELAND COMPANY
FOUNDRY DIVISION
MAIN OFFICE AND MANUFACTURING PLANTS
CHATTANOOGA 2, TENNESSEE

(*Concluded from page* 103)

The three officers had served the foundry since it was established in 1895. **Charles T. Slonaker,** son of N. H. Slonaker, and until recently engaged in engineering and sales, has been elected president, general manager and chairman of the board of directors. **Edward M. McCausland,** son of the former president, has been named vice president, and **G. Edward Clifton,** secretary-treasurer.

♦ ♦ ♦

Howard E. Edsall is general superintendent at the Sorel, Quebec, plant of Sorel Steel Foundries Ltd., Montreal. He has been associated with foundries for 13 years and while a student at Ohio Northern University Mr. Edsall worked during vacations in various foundry departments of Marion Power Shovel Co., Marion, O. Following graduation from the university he served as assistant superintendent with the company from 1940-42, when he became superintendent. He joined Sorel Steel Foundries Ltd. a year ago as general superintendent.

♦ ♦ ♦

Howard F. Moncrieff, formerly vice president in charge of sales, Swan-Finch Oil Corp., New York, has been elected president, succeeding **Ernest V. Moncrieff,** who has been named chairman of the board. Both have been associated with the company over 30 years.

♦ ♦ ♦

W. J. Vossbrinck has been appointed sales manager of the Cleco Division, Reed Roller Bit Co., Houston, Tex. The new division has been organized for the manufacture and distribution of rotary and reciprocating pneumatic tools. Mr. Vossbrinck was graduated from Lafayette College and has had 13 years of experience in the pneumatic tool and compressor industry.

Donald H. Workman has been appointed promotion manager for the Gray Iron Founders' Society, Cleveland. Mr. Workman was graduated from Wharton School, University of Pennsylvania, in 1938 and was associated with the personnel and public relations department of the Philadelphia Electric Co. prior to his being

DONALD H. WORKMAN

commissioned an ensign in the U. S. Naval Reserve in 1942. After 3½ years with the Navy he returned to inactive duty as a lieutenant and rejoined Philadelphia Electric Co., where he remained until joining the Gray Iron Founders' Society.

♦ ♦ ♦

Lester Samstag, metallurgical production engineer, General Aluminum Mfg. Co., Cleveland, has been appointed production metallurgist. Mr. Samstag attended Baldwin-Wallace University and was graduated from Ohio State University. He spent 5 years with Aluminum Co. of America in its permanent mold department at Cleveland, and a year as metallurgical production engineer at Maco Corp., Huntington, Ind., prior to joining General Aluminum Mfg. Co. **Robert E. Keith** has been appointed metallurgical sales engineer. Mr. Keith attended Missouri School of Mines and Colorado School of Mines. Following Army service he became assistant plant metallurgist at the Cleveland plant of Aluminum Co. of America and 2½ years later was made production metallurgist in the aluminum foundry of Thompson Products Co., Cleveland, where he remained over a year.

♦ ♦ ♦

Norman Weinstein has been appointed vice president in charge of the Calisco Engineering Division, Calumet Iron & Supply Co., East Chicago, Ind. Mr. Weinstein was formerly chief engineer at Chicago for the Dry Blast Division of Trane Co., La Crosse, Wis. His new duties will be towards broadening the use of air conditioning equipment for steel mills, foundries, refineries, etc.

♦ ♦ ♦

Dr. Jesse E. Hobson has resigned as director of Armour Research Foundation of Illinois Institute of Technology, Chicago, to become executive director of the Stanford Research Institute, Stanford University, Calif.

♦ ♦ ♦

J. M. Morrow has been appointed vice president in charge of sales, Dayton Steel Foundry Co., Dayton, O. Mr. Morrow has been associated with the company in a sales capacity for the last 20 years.

♦ ♦ ♦

Orville Roach has been appointed superintendent of Muncie Aluminum Foundry, Muncie, Ind. Mr. Roach until recently was foundry foreman, Anderson Brass Foundry Co., Anderson, Ind.

♦ ♦ ♦

Ronald Dodge has been appointed superintendent, Mold-Cast Alloys Corp., Indianapolis, succeeding **Charles Netz,** who has resigned.

HOWARD E. EDSALL

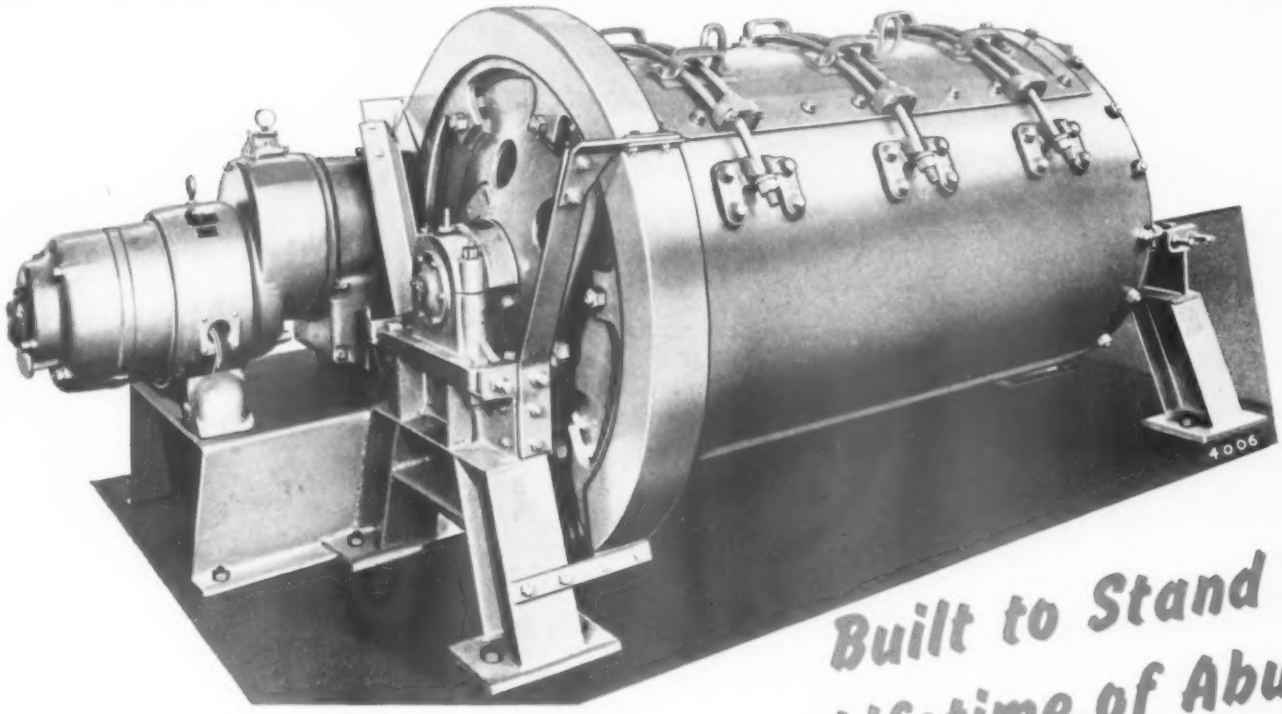
ERNEST V. MONCRIEFF

HOWARD F. MONCRIEFF

W. J. VOSSBRINCK

SLY TUMBLING MILLS

THE STANDARD OF STURDINESS



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In 1915 we built Sly Tumbling Mills and have been building them ever since. Many of the earliest ones are still in use.

Today we are building Sly Tumbling Mills immeasurably more sturdy—for even longer life. They have won widespread recognition as the Standard of Sturdiness.

Modern throughout:

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- Individual motor drive for operating flexibility
- Positive brake for stopping and holding the mill securely for loading and unloading
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All add up to . . .
safe and economical operation.

Use modern equipment to combat high costs.
Sly engineers will help you solve your tumbling problems. Write us.

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HE NEWEST THING IN

FOUNDRY MOLDING MACHINES

See

THE NEW "DAVENPORT" MODEL

10-Y JOLT SQUEEZE STRIPPER

at the

FOUNDRY CONGRESS AND SHOW

in Philadelphia May 3-7, 1948

DAVENPORT MACHINE AND *Foundry Company*

DAVENPORT, IOWA U.S.A.

REPRESENTATIVES: CANADA: Canadian Foundry Supplies & Equipment Ltd., Toronto and Montreal

MANUFACTURERS OF FOUNDRY MOLDING MACHINES FOR OVER 35 YEARS

Among conference participants were, left to right: Dr. J. T. MacKenzie, American Cast Iron Pipe Co.; D. C. McMahen, Harbison-Walker Refractories Co.; J. M. Bates, Moore-Handley Hardware Co.; L. N. Shannon, Stockham Pipe Fittings Co., and Max Kuniansky, Lynchburg Foundry Co.

BIRMINGHAM *Conference Report*

By WILLIAM G. GUDE
THE FOUNDRY

SIXTEENTH annual Foundry Practice Conference of the Birmingham District Chapter, American Foundrymen's Association, comprised an interesting program of five technical sessions, in addition to plant visitations, a luncheon meeting and the annual banquet. The meeting was held at the Tutwiler Hotel, Birmingham, Feb. 12-13, and had a total attendance of more than 400 southern foundrymen.

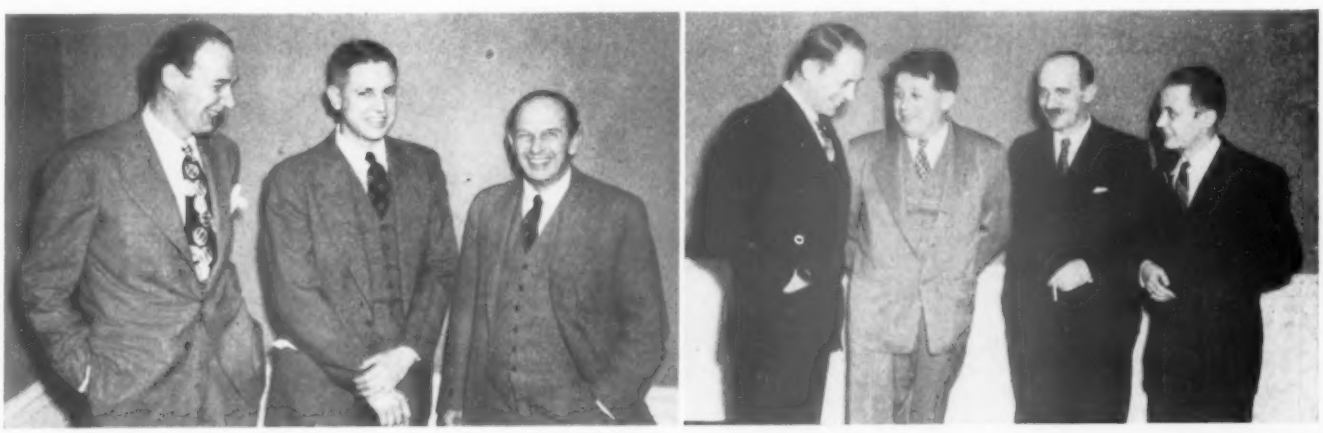
The program was arranged under the direction of Dr. James T. MacKenzie, American Cast Iron Pipe Co., chairman of the program committee, with Charles K. Donoho, of the same company, as vice chairman. Dr. MacKenzie presided at the Thursday noon luncheon at which Max Kuniansky, vice president, Lynchburg Foundry Co., Lynchburg, Va., and national president of AFA spoke. Both he and William W. Maloney, national secretary-treasurer of AFA, who also was one of the speakers, discussed various activities of AFA.

W. E. Jones, Stockham Pipe Fittings Co., and chairman of the Birmingham District Chapter, presided at the annual banquet Friday evening. Toastmaster was Tom H. Benners, Jr., T. H. Benners & Co., who introduced the guest speaker, Dr. Albert L. Branscomb, Tuscaloosa, Ala. Dr. Branscomb's talk, titled "Living on Tiptoe," was interspersed with broad humor, and at the same time contained the recommendation that everyone should be living up to expectancy. He told his audience that a man should stand on tiptoe to live life to the fullest extent in order to make the most of his own abilities.

Friday morning was devoted to plant visitations arranged by a committee headed by Joe T. Gilbert, Stockham Pipe Fittings Co., and Dan D. Dimick, Dimick Casting Co. The Thursday evening entertainment program was under the chairmanship of D. C. McMahen, Harbison-Walker Refractories Co., and C. B. Saunders, Southern Ferro Alloys Co.

At the opening technical session, Wallace L. Hawkins, Stockham Pipe Fittings Co., presided, and the speaker was F. T. Jazwinski, chief metallurgist for Barium Steel Corp., New York, and vice president of its subsidiary, Sheffield Iron & Steel Co., Sheffield, Ala. Mr. Jazwinski's talk, "A New Approach to Feeding Castings," discussed a method for introducing pressure higher than atmospheric into the feeder heads of cast-

(*Continued on page* 115)



Speakers and chairmen at the Birmingham conference included, left to right: Karl Landgrebe Jr., the Wheland Co., Chattanooga, Tenn.; C. K. Donoho, American Cast Iron Pipe Co.; T. H. Benners Jr., T. H. Benners & Co.; Gosta Vennerholm, Ford Motor Co., Dearborn, Mich.; Max Kuniansky, Lynchburg Foundry Co., Lynchburg, Va., S. T. Jazwinski, Sheffield Iron & Steel Co., Sheffield, Ala., and R. F. Frings, Central Foundry Co., Holt, Ala.

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Now—at a cost far less than you think—you can bring fool-proof electronic heat control to furnace, melting pot, oven, kiln—in fact, to any heating device using electricity, gas or oil! The Alnor Electronic Pyrometer Controller is a fine, precise instrument, at home in laboratory or production operations. Yet, its simplified design means real savings to you! Pyrometer movement is double-pivoted on jeweled bearings; 6-inch mirrored scale is easy to read; automatic cold-end compensator, weather-proof, dust-tight case—a truly high-quality instrument *you* can afford!

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(*Continued from page* 113)

ings.

This method incorporates the control of directional solidification by the temperature gradient, and makes use of a compound which, upon heating, develops a gas which provides the additonal pressure employed. In application, a core print is placed where the pencil core usually is located in the Williams riser used in steel castings. A container, suspended from this print, holds a compound which will evolve gas when heated to a certain temperature. When the metal is poured through the down runner, the casting and feeder head are full of metal. Subsequently, when sufficient skin thickness is created on the head, the heat at that time should penerate to the inside of the container and the gas evolved builds up the pressure and forces the liquid steel from the head to the casting.

Powder Develops Pressure

It is important that a sufficiently thick metallic skin on the feeder head be formed before gas pressure develops. This is accomplished by using a material for the container which has low heat conductivity and specific thickness. The compound used, a powder, develops a pressure of 4 to 5 atmospheres.

Use of this method is said to have increased the yield by 15 to 20 per cent on various types of castings. Cleaning cost, it is reported, has been reduced up to 60 per cent. In addition, the pressure developed in the mold has overcome the difficulty of feeding thin casting sections, and is able to force metal through such thin sections to thicker sections.

Gosta Vennerholm, Ford Motor Co., Dearborn, Mich., discussed casting methods in automotive manufacture at the second technical session, at which Karl Landgrebe, Jr., the Wheland Co., Chattanooga, Tenn., was chairman. The speaker pointed out that foundries must be alert in meeting the competition of other forms of metal fabrication. In this connection, he indicated that the malleable iron industry recently has advanced metallurgically to a greater extent than have gray iron or steel foundries, especially in melting practice. Mr. Vennerholm showed slides illustrating various casting applications in automobile manufacture, including axle housings, differential cases, crankshafts, brake drums, pistons, and gears. He stated that Ford Motor Co. is engaged in a $12 million program of improvements to its foundry facilities, three-fourths of which is completed. As a result of this work, the company now is able to pour more than 6000 cylinder blocks daily compared with 5000 previously, with the same number of operators. A moving picture was shown illustrating the molding and pouring of cylinder blocks.

Another moving picture, entitled "Cylinder Block Cleaning" was shown through the courtesy of the Pangborn Corp., Hagerstown, Md. at a subsequent session under the chairmanship of Jack Hayes, J. B. Hayes Co. This picture illustrated airless blast cleaning of the Ford cylinder blocks. Blocks move continuously from the shakeout on an overhead conveyor through the blast cabinets.

Practice developed by the Central Foundry Co., Holt, Ala., in the centrifugal casting of soil pipe was described in a paper by R. L. Farabee, vice president, and Ray L. Frings, chief metallurgist, at another technical session. John F. Wakeland, Alabama Foundry Co., was chairman.

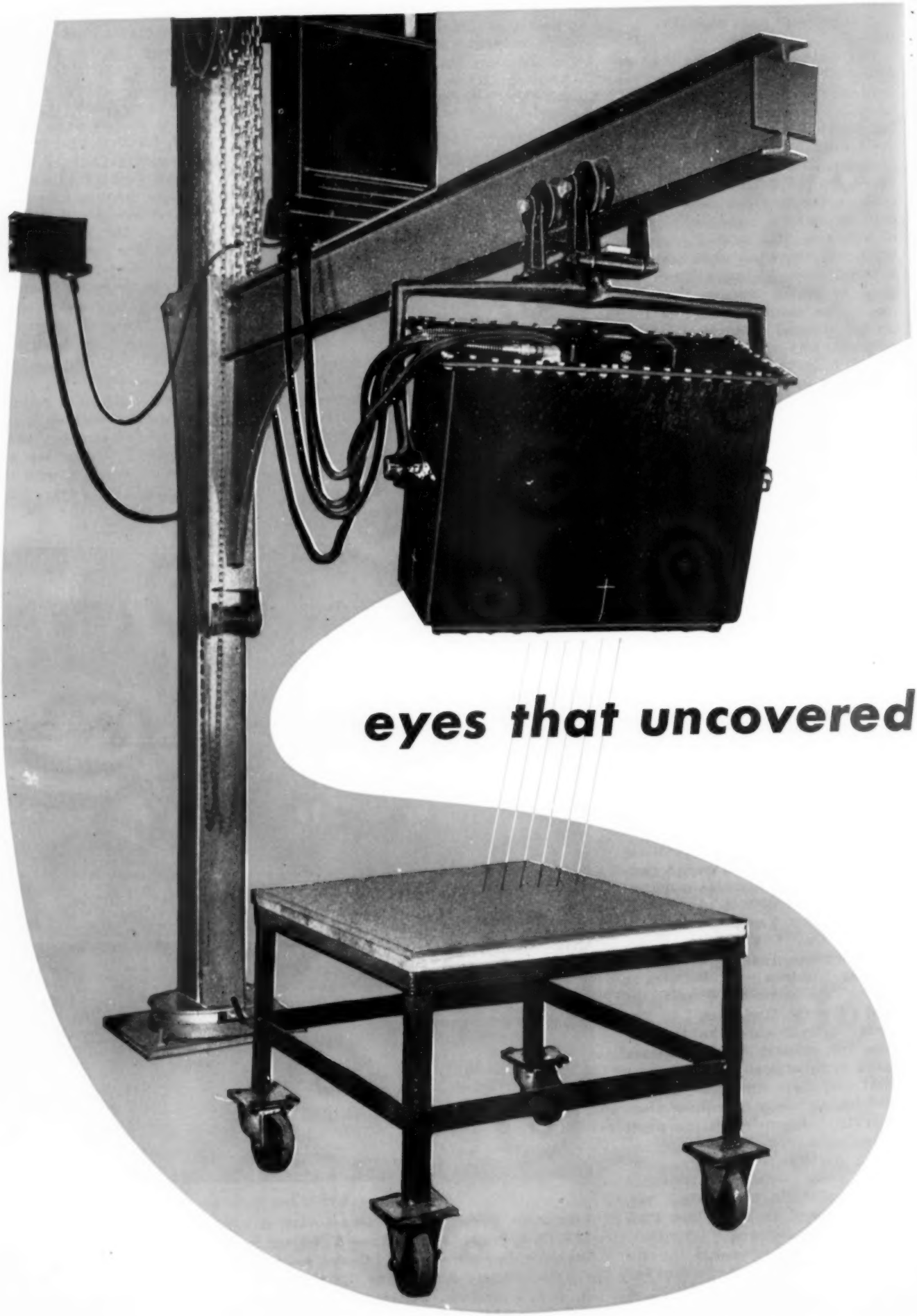
The cast iron mold employed by the company splits longitudinally, the two halves being fitted with a joint that prevents iron from leaking through the mold during pouring. Four years of experimentation have resulted in the process as now employed, which produces pipe without subsequent heat treating and at an extremely high rate of production. The centrifugal casting machines used have a closed circuit, with a service rack at the opening and closing side of the machines. Immediately over each machine is a mold rack where the mold from the previous cast is placed after clamping. Interior of the mold is sprayed with a water suspension of nonmetallic particles while on this overhead mold rack.

Mold spinning mechanism consists of two horizontal power-driven shafts parallel to each other, each shaft having two groove rollers set approximately 3½ feet apart, with the

(*Concluded on page* 118)

(All conference photos by John C. Graham Jr., Stockham Pipe Fittings Co.)

Seen at the Birmingham conference. Left to right, top row: W. W. Maloney, AFA; F. K. Brown, Adams, Rowe & Norman Inc.; Max Kuniansky; W. E. Jones Stockham Pipe Fittings Co. Center row: D. C. Abbott, Hill & Griffith Co.; J. T. Gilbert and A. H. White, Stockham Pipe Fittings Co.; T. H. Benners Jr.; Dr. A. L. Branscomb. Bottom row: A. H. White, registration chairman; W. O. McMahon; L. B. Molloy and C. L. Triplett, Tyler Pipe & Foundry Co., Tyler, Tex.


eyes that uncovered

• As an inspection device, industrial x-ray is a swift substitute for physical test and sectioning. But its applications are much broader.

• For General Electric Industrial X-Ray has become a *development* tool. It not only diagnoses, but suggests treatment. It shows where savings can be made, designs improved, new techniques developed.

• General Electric X-Ray Corporation leads the way in shaping the forces of electronics to every industrial need. There are industrial x-ray units for visual inspection of light metal castings, packaged goods and small assemblies. Other G-E X-Ray units tell a story of economy for the heavy metal industry. And G-E Diffraction units analyze metals, chemicals and metal alloys at a cost lower than by any other method.

$35,000 a month in a scrap heap

THE complicated design of a 40-pound flywheel housing meant trouble for the foundry. Too many flaws showed up in too many castings. 12 out of each 100 ended as scrap. Resulting losses were heavy. Even more serious were delays in deliveries.

Stepped-up production, at that time, was out of the question. Management looked again at the rusting scrap heap. Could the rejected parts be salvaged?

Welding was an answer. Flaws were burned out and the metal filled in. But were the welded castings as sound? And, if so, could the customer be convinced?

The foundry's General Electric Industrial X-Ray unit made "portraits" of the two types of castings —showed the one equal in quality and soundness to the other. The films convinced the customer.

Deliveries got back to normal. $35,000 a month in castings was plucked from the scrap heap. A 20% saving was passed on to the customer. Industrial x-ray once again more than paid for itself on the first assignment.

In the casting of steel and the molding of plastics: on scores of assembly lines, G-E Industrial X-Ray curbs waste, speeds production, helps build better goods. Is there a place for industrial x-ray in your business? A General Electric X-Ray engineer will be glad to talk it over. Write or wire. General Electric X-Ray Corporation, Dept. D-37, 4855 McGeoch Ave., Milwaukee 14, Wisc.

GENERAL ELECTRIC X-RAY CORPORATION

• General Electric X-Ray Corporation manufactures and distributes x-ray apparatus for industrial, dental and medical use; electromedical apparatus; x-ray and electromedical supplies and accessories.

(*Concluded from page* 115)
rollers on the two shafts opposite each other. The spun mold is cradled between these two driving rollers. Between the driving rollers is a hydraulic lift which contacts the rollers on the mold and facilitates the removal of the mold after pouring.

A precision pouring mechanism is placed at the front of the machine and meters the iron into the mold in such a manner as to uniformly distribute the molten metal over the entire length of the mold. The ladle is tilted by a hydraulic device which varies the quantity of iron for each increment of time during pouring in such a manner as to provide uniform distribution of iron in the mold. The mold is rotated at a constant speed during the entire spinning operation. A special hydraulic device is employed to clamp the two halves of the mold together. To date, the company has produced more than 2 million 5 ft lengths of soil pipe by this method.

DOUBLES FOUNDRY CAPACITY

(*Continued from page* 77)
Sand is obtained quickly from overhead hopper.

Specially designed conveyor cars, holding four to eight molds, transfer the deposited molds to the pouring station. There the molds are poured from 200-lb ladles, then cooled and dumped onto the oscillating conveyor. Mold cars are lifted to overhead rails and roll back to the molder who, by a simple turn of a lever, drops them as needed onto the lower rails for reuse.

In addition to these major molding departments, facilities are available to make bench and side floor molds from loose patterns.

Sand preparation equipment, located at the south end of the foundry, furnishes two different mixtures to the various floors — one for the squeezer floor and the other for the rollover machines and the sandslingers serving the sprocket molding and floor molding departments. Used sand from the oscillating conveyors is carried by belts over magnetic pulleys to remove metallic particles, and then is raised by bucket elevators to vibrating screens which eliminate other foreign materials. Core butts and other rejected pieces are discharged from the top of the screens and chuted into refuse trucks at the floor level, while the screened sand drops into a storage bin. This bin, of 400 tons capacity, is divided in the middle to provide two 200-ton compartments located above two mullers (Fig. 11). Provision is made for a third muller.

At present each muller is served by one of the two storage bin compartments. With three mullers the center unit will receive sand from either compartment and can supplement the sand mixture furnished by either of the two adjoining mullers to the particular molding department each serves. This will permit operation of both systems during a period of limited operation by using only one muller. The mills originally were set up to operate manually, and this still can be done, but fully automatic control now is provided with use of timers and solenoid-operated air valves. The company has found that a greater volume of sand is handled when automatic control is employed.

Batch Size Easily Adjusted

Hoppers, which discharge a measured amount of sand into the muller, are equipped with double gates, the bottom gate being open when the upper gate is closed, and vice versa. Size of the batch can be adjusted by moving baffle plates located inside the hopper. This adjustment can be made easily from the outside and the plates can be locked in position.

The mixing cycle calls for introduction of water then sand, followed by 10 or 15 seconds of mulling before addition of the bond. More water then is added if necessary. The amount of additional water is determined by the operator through observation of an indicating thermocouple which shows the temperature of the sand in the measuring hopper. This temperature is calibrated in gallons of water needed to compensate for the amount of evaporation that will occur in reducing the temperature to the desired level. Further control is exercised by observation of an ammeter connected to the driving motor. High amperage indicates excessive moisture.

When mulling is completed the sand is discharged onto a belt and conveyed to an elevator which drops it into an aerator. From the aerator the sand moves to distributing belts for delivery to the molding stations. An operator stationed on a catwalk along the distributing belt plows off the sand into individual hoppers as needed. A signal system permits molders to indicate to the operator when anything wrong is encountered with the sand or the supply runs short.

Molding sand mixtures have a base of washed and dried silica sand of No. 70 AFA grain size. The mixture for the squeezer floor consists of 1100 lb of return sand to which is added 2 lb southern bentonite, 5 lb clay bond and 2 lb Permibond. For floor and rollover work the addition to 1100 lb of sand is 2 lb western bentonite, 6 lb clay bond, 6 lb seacoal and 2 lb corn binder. These proportions may be varied somewhat from time to time to suit foundry conditions. Sand mixtures are tested by conventional methods at frequent intervals during the day and necessary adjustments are made when necessary.

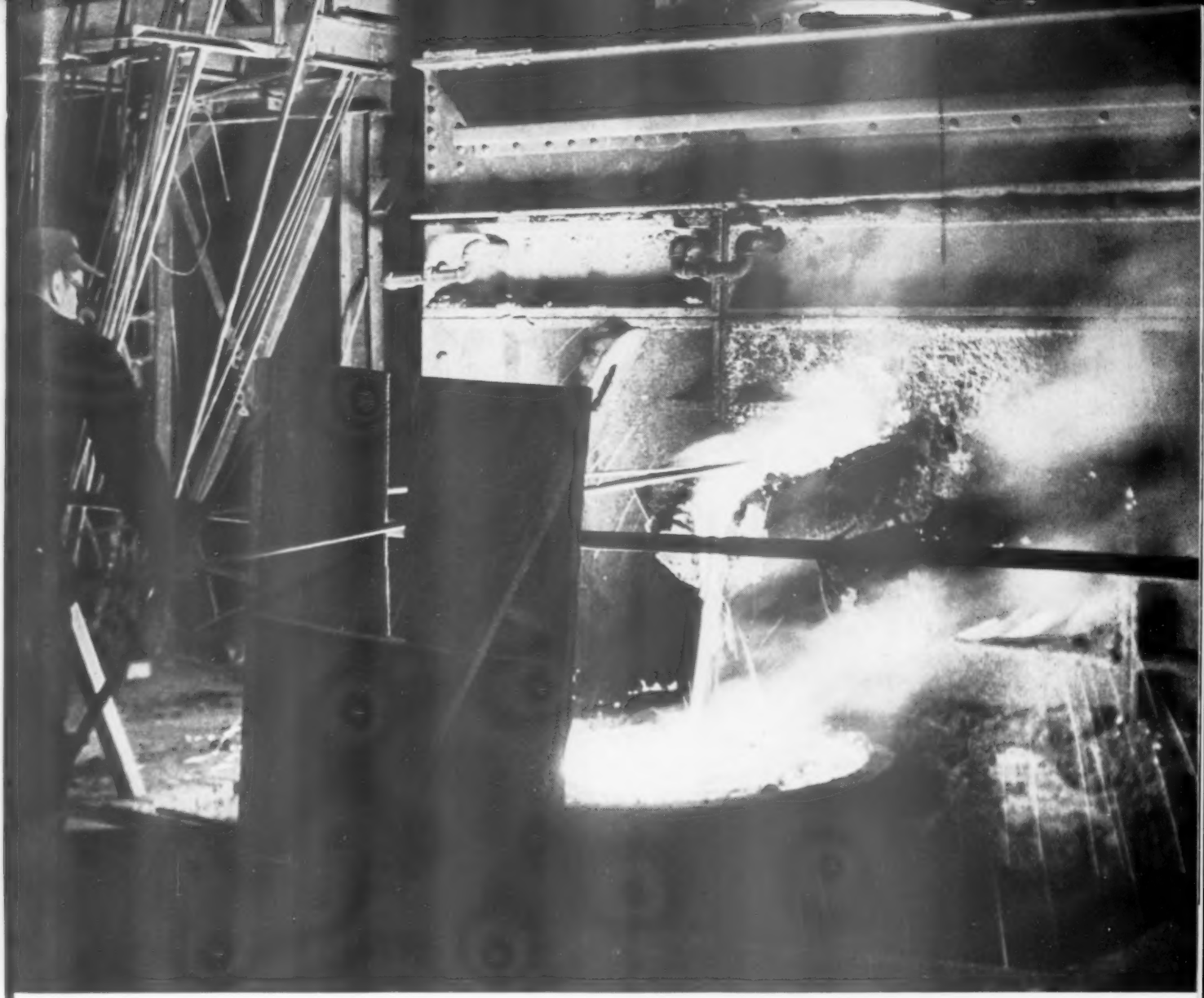
The coremaking department is divided into two separate sections—one for medium size and large cores and the other for small cores. A variety of methods are employed in producing the relatively large number of different size cores required. These include bench work and blowing, in the case of smaller cores; and jolt rollover draw machines (Fig. 12) for repetitive jobs in the larger sizes. Green cores are loaded on racks and moved by lift truck to the rack type, oil-fired recirculating ovens. The large core department has three ovens, these being operated at 450 to 475° F, while the four ovens for baking small cores are held at 400° F.

Use Several Sand Mixtures

Most cores are made of a mixture employing 70 mesh washed and dried silica sand in a ratio to oil of 60-1, with an addition of 0.5 per cent (by weight) of cereal binder. For certain large work this mixture may include half and half molding system sand and silica sand plus a pitch binder and cereal as needed.

Two cupolas—No. 4 and No. 7 units—supply hot metal. The smaller cupola, lined to 42 in. diameter, operates from 6:30 a.m. to 11 a.m. and produces 11,000 pounds per hour. The larger cupola, lined to 54 in., usually melts from 11 a.m. to 4:30 p.m. and supplies about 24,000 lb of iron per hour. These schedules may be varied to suit demand from the pouring floor, the arrangement permitting operations of both cupolas to overlap when additional metal is required.

Pig iron and scrap are delivered by rail to the stock yard along the west side of the foundry and unloaded by a 5-ton overhead crane. This crane also is used to make up metal charges. Scrap and pig iron are deposited in boxes spotted on the scale platform at the charging floor level, as shown in Fig. 13. After the weight is recorded the box, holding a charge of up to 2000 lb, is
(*Concluded on page* 120)



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GRADE "C" *(Primos)*	Vanadium . . . 35-45% Silicon . . . max. 1.25% Carbon . . max. 0.20%
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(*Concluded from page* 118)

picked up by a fork truck and its contents dumped into the cupola. As shown in Fig. 14, the truck is equipped with hooks which engage pins on the side of the charging box after it is lifted. This tilts the box when the truck forks are lowered, and the charge spills over the open front end.

Coke is charged in a similar manner. An elevator brings the coke in a truck from the ground to the charging floor, where it is deposited in a storage bin holding a day's supply. From this bin it is forked by hand into a charging box to remove excess fines. This seemingly unnecessary and expensive manual handling has been necessitated by the deterioration in foundry coke structure. Unloading and charging raw materials require the services of three men in addition to the crane man. The cupolas are relined at night.

Hot metal is taken to the squeezer floor in covered ladles and placed in ladle stands. This metal is poured into the 200-lb ladles hanging on trolley conveyors from which it is introduced into the molds. Rollover and floor molds are poured from ladles carried by overhead cranes. Pouring is done at about 2700° F in all departments. Nominal composition of the soft gray iron is: 3.30-3.50 per cent C; 2.00-2.20 per cent Si; 0.40 per cent P; 0.50-0.60 per cent Mn; and 0.135 per cent S. Sprocket iron includes: 3.40-3.50 per cent C; 1.00-1.20 per cent Si; 0.20-0.30 per cent P. 0.50-0.60 per cent Mn, and 0.135 per cent S. Prominent among a variety of alloy iron compositions poured is the Ni-hard grade containing 3.30-3.50 per cent C; 0.30-0.50 per cent Si; 4.50 per cent Ni, and 1.50 per cent Cr.

Rear slagging is employed on the cupolas, and slag is collected in ladles having a V-shaped bottom. The difference between the specific gravity of slag and that of iron causes the small amount of the latter which escapes from the cupola with the slag to settle to the bottom of the ladle. When the solidified mass is dumped this small section of iron is easily removed from the slag and provides about 100 lb of usable metal.

The casting cleaning department is located to one side of the main foundry floor and on a lower level. Difference in floor level is caused by a slope in the site on which the plant was built. An elevator lowers the truckloads of castings from the shakeouts to the cleaning room.

Eliminated Manual Labor

Cleaning equipment figured prominently in the plant expansion program, and provided not only increased capacity for finishing castings but also eliminated some of the manual work formerly required. This additional cleaning capacity, which was necessary to match the increased production of castings, was accomplished largely by replacing some older facilities by new high-speed equipment.

The new units include an airless blast barrel and an airless blast table. A previously installed sand blast room also is available. Work is apportioned among these different units according to size and type of the castings. Small castings, for instance, usually are cleaned in the barrel, although types susceptible to breakage in tumbling are placed on the blast table for cleaning. The proportion of work cleaned per hour is approximately 5¼ tons for the barrel, 3 tons for the table and 3½ tons for the blast room. The new setup required no addition to the former cleaning room floor space but has effected a reduction of 75 per cent in cleaning time.

Castings are rough inspected before the various chipping and grinding operations, followed by final inspection and shipment. Cast housings for speed reducers are given special cleaning and finishing to make sure all sand and fins are removed. They are then painted inside and out before being delivered to yard storage.

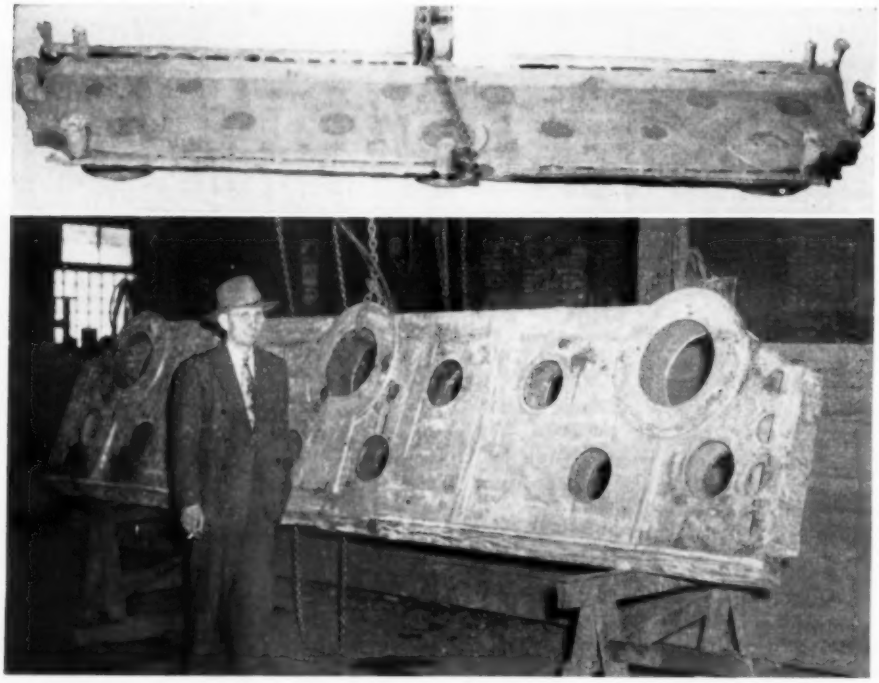
Aluminum Casting Weighs 2350 lb.

WHAT is believed to be the largest aluminum casting made in the Chicago area was produced recently by the Hodgson Foundry Co., Chicago. Cleaned and ready for machining, the casting weighed 2350 pounds. It is part of a wood veneer slicing machine being built by the Clearing Machine Corp., Chicago.

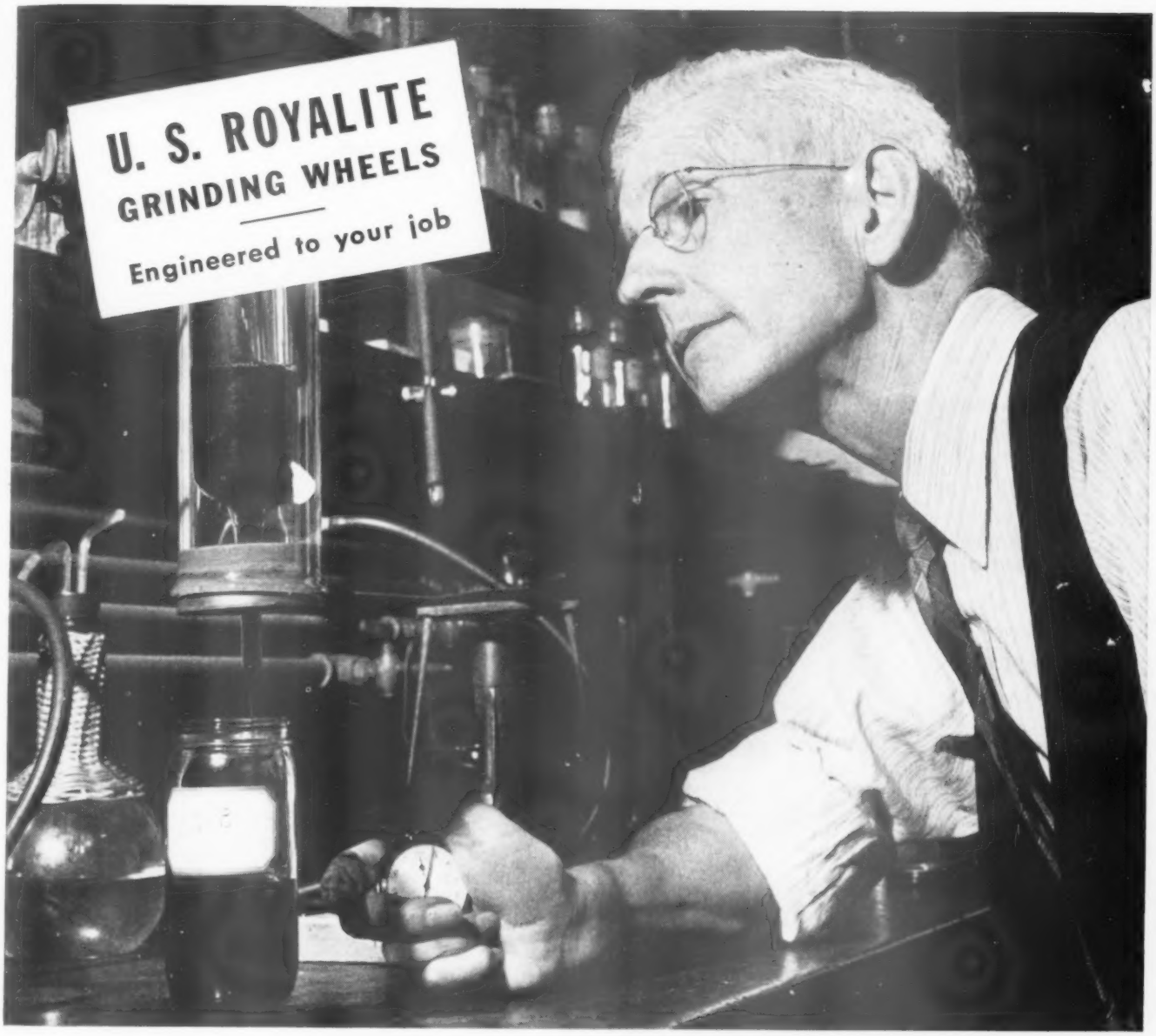
The casting, shown in the accompanying illustration, was 189 in. long, 56 in. wide and 6 in. thick, and except for the ribs was completely cored. Metal thickness was 1¼ in. It was poured in a mold made from No. 1 Albany sand. Numerous chills were placed in the drag.

It was cast from No. 12 aluminum alloy containing 8 per cent copper, the metal being melted in six tilting, oil-fired furnaces, and subsequently held in two large ladles.

Pouring of the mold was through three gates, shrinkage being accommodated by six 4-in. diameters risers 12 in. high. The risers were kept open for four additional feedings through use of an exothermic feeding compound. The finished casting was free from shrinkage cracks.



This aluminum alloy casting weighing 2350 pounds—part of a wood veneer slicing machine—is believed to be largest aluminum casting made in the Chicago area. Top view shows the casting in the as-cast condition



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Around DETROIT

By A. H. ALLEN
Detroit Editor
THE FOUNDRY

Extensive changes incorporated in Ford's foundry modernization program . . . New highly mechanized coreroom for supplying cylinder block molds shows sharp reduction in core scrap

IN THE MIDST of the most extensive and expensive program of plant and equipment rearrangement in the history of the Ford Motor Co., or probably any other company for that matter, incident to the start of production on completely new Ford and Mercury passenger cars, company officials look forward with considerable enthusiasm to the productive possibilities of their refurbished gray iron foundry on which $12 million is being spent.

The Ford production foundry in the past did not lend itself to ideal working conditions. Equipment was packed in tightly, leaving insufficient room for comfortable traffic. The entire layout was full of inconsistencies in respect to smooth flow of materials. One engineer, not with the company, said if he had it to do he would tear down the whole place and start over again. That, of course, was hardly a practicable solution, so Ford engineers went to work to see how they could improve what they had to start with, and they have achieved considerable success.

Working conditions have been much improved, operations better engineered, and control methods made more precise. The cylinder block line reflects many of these advances. Casting cooling lines and vibrating core knockouts have been rebuilt. Maintenance on molding reels is simplified and improved to reduce breakdowns to a minimum. More mechanical metal handling equipment has been installed to expedite the transfer of better than 1000 tons of iron required each day for block molds.

Melting system remains essentially the same. Cupola metal and blast furnace metal are deposited in 400-ton mixers where temperature is raised 300 degrees prior to transfer to 30-ton coal-fired air furnaces which hold metal at temperature and which tap continuously into two ladle cars at the moving cylinder block lines. Continuous pouring requires mechanization to a high degree, and the failure of a mold to arrive at the pouring station when it should makes some sort of stand-by ladles essential. Advantages of consistent metal analysis and accurate control of pouring conditions and temperature outweigh the difficulties of occasional trouble with the mold line.

The entire coreroom supplying the cylinder block molds has been rebuilt into another highly mechanized layout. Each V-8 block has 46 separate cores, which explains the fact half the manpower assigned to cylinder block production is devoted to coremaking. The new setup on cores has slashed core scrap to less than 5 per cent, with a concurrent increase in quality of castings. Salvage on blocks is less than half what it was in prewar days, and scrap losses also are reported to be lower. If true, this contradicts the postwar experience of many other gray iron foundries in the business, which has seen scrap losses climb in the face of difficulties in holding quality and uniformity of all raw materials.

By staggering changeover schedules in various departments in accordance with their timing in the new production sequence, Ford has been able to hold layoffs in the vast Rouge plant to a minimum, estimating the total number affected to be in the vicinity of 20-25,000, out of total full complement of 65,000. About 19,000 in buildings involved in the changeover were slated to work through without interruption, and 20,000 in other operations such as blast furnaces, steelmaking, glassmaking, etc., likewise were unaffected. Layoffs were to range from two to six weeks and the entire changeover job is supposed to be wrapped up by May 1.

The production foundry was scheduled to reduce operations to four days a week instead of five, to accumulate a float of castings ahead of the final assembly line. A two-week shutdown late this month is indicated. In the foundry machine shop and motor building, operations were closely geared to foundry output, and completed motors will provide a float to accommodate steadily increasing new car schedules in May and June. About 3500 in the motor building were without work for two weeks early last month, although 5000 continued on the job; something over 1000 in the foundry machine shop lost a similar amount of time last month.

Both Lincoln and Mercury models, identified as 1949 types, are now in fair production, and were previewed by dealers and the press on March 22. Lincolns are built entirely in the Lincoln plant in Detroit where operations started Mar. 1 on two series of eight body types each—the Lincoln and the Lincoln Cosmopolitan. Mercury production in the Detroit area is concentrated at the Ford Rouge plant, although three new assembly plants—at Metuchen, N. J., St. Louis and Los Angeles, will come into production on Lincoln and Mercury models exclusively, these lines being divorced almost completely from the Ford lines, as to design, production and distribution. The Lincoln, incidentally, sports a new V-8 engine of 145-horsepower rating, also used to power heavy Ford trucks.

Suggestion System Adopted

Employees suggestion systems are gradually being placed in effect throughout the Ford operations. The first was set up in the Lincoln plant and has proved eminently successful. Recently the steel foundry at the Rouge plant instituted the idea and the first award, amounting to $31.25, went to an employee who suggested that annealing furnace charging cranes be equipped with floodlights to facilitate furnace loading and unloading. The installation calls for six 10-inch floodlights mounted to illuminate the greater part of the inside of the furnace and the charging door. Previously, crane operators relied on furnacemen's hand signals when moving a load of castings in and out of the furnace. Close clearances between the load and the furnace walls and door made them susceptible to considerable damage from unavoidable bumping and scraping. With the floodlights, the crane operator can handle the entire job except for raising and lowering the door, resulting in appreciable savings in broken piers, furnace linings, arches and hoods.

Product study engineers of General Motors are understood to be working in co-operation with Chevrolet transmission experts in designing an automatic torque-converter plus fluid coupling type transmission for an early Chevrolet model. By early

(*Concluded on page* 124)

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(*Concluded from page* 122)
is not meant this year, but rather the model which might appear around September, 1949, always assuming developmental work proves out the device. The transmission is identical with the Buick Dynaflow drive, except that it would be tailored for the Chevrolet engine. A peculiarity of this type of drive is that it must be engineered carefully to the engine characteristics, this being the principal reason why the Dynaflow cannot be used with the smaller Buick engine incorporated in Super and Special Buick series.

It appears unlikely Buick will design a transmission for this smaller engine, for one reason because the engine may in a year or so be superseded by a V-8 overhead valve design with considerably higher compression ratio, requiring an altogether different transmission.

Chevrolet's selection of the Dynaflow-type unit in preference to the Hydra-Matic transmission, used by Pontiac, Oldsmobile and Cadillac, doubtless springs from the fact it can be built in volume at a somewhat lower figure, since it has only about half the number of parts that are required in the Hydra-Matic. Also, of course, engineers may prefer the operating characteristics of the torque-converter unit as opposed to the step-type automatic design.

Many Changes in Supervision

Wilson Foundry & Machine Co., Pontiac, Mich., wholly owned subsidiary of Willys-Overland, currently reports it is melting about 370 tons of iron daily, supplying castings to Willys, Kaiser-Frazer, Chrysler, Continental, Whizzer Motors and others. However, Pontiac operations have been somewhat erratic, and recently changes in supervisory ranks have been taking place. Latest official announcement elevates A. J. Wieland, executive vice president of Willys-Overland, to vice chairmanship of the board of directors of Wilson Foundry. Chairman is H. J. Leonard, who is not too active in the business any more. W. A. Hambley, in earlier years with Falls Mfg. Co., Studebaker and Allis-Chalmers, and more recently a foundry consultant, is the new foundry manager at Wilson. Several others in executive and supervisory ranks have resigned.

City Pattern Foundry & Machine Co. has put the finishing touches on a $15,000 modernization program, involving installation of new cranes, rearrangement and addition of equipment, to provide space to handle additional work and to expedite that now in process.

SOLIDIFICATION OF TIN BRONZES

(*Continued from page* 71)

branches, the secondary axes also throwing off branches, just as twigs grow out from the branches of a tree. The term "dendrite" is derived from a Greek word meaning "tree". While the major and minor axes are forming, the space between them will be filling up by the deposition of solidified metal. If the dendrite should continue its free growth equally along all axes as shown in Fig. 1 and the space between the branches became immediately filled with solidified metal, the final crystal should be a perfect tetrahedron similar to that shown in Fig. 2.

Dendrite Growth Uncertain

As long as the dendrite remains immersed in molten metal, growth should continue equally along each axis. The instant, however, that one of the axes comes into contact with another axis in the same or neighoring dendrite, the growth of that axis will cease. Other free axes will continue to grow, however, as long as they are in contact with liquid at the solidifying temperature. Because of the interference of neighboring dendrites, the growth of any individual dendrite will be confined in one or more directions with the result that, in the completely solidified mass, the crystal structure may bear little relation to the tree-like structure or to the perfect crystal illustrated. In a polished and etched cross section, it may be possible to pick up these dendritic structures and to define the individual branches.

Of course, few large dendrites have the perfect shape shown. The fundamental characteristics for dendritic growth will vary with different metals. Some metals grow much faster along one axis than along the other two, or all three axes may have different rates of growth. Some metals will throw out axes at a rapid rate, others will tend to solidify between the axes as fast as the axes grow. Convection currents within the mass of molten metal may cause a faster rate of growth on one side. Currents set up by feeding may break some of the axes which will then continue their growth in different directions. The following facts should be evident from the previous description:

1. The longer any dendrite is in contact with molten metal, the larger that dendrite will tend to grow.
2. The more dendrites which grow in a certain volume, the smaller they will be.

Fig. 3 illustrates the probable mechanism of solidification of metal within a mold cavity. In this illustration the mold cavity and the different solidification zones are shown approximately actual size while the grains themselves are magnified. A further liberty has been taken in that only the main and the secondary axes are shown, no filler metal being indicated.

When the metal enters the mold cavity, a layer of chilled metal where the melt comes into contact with the comparatively cold walls of the mold first will be formed. The thickness of this chilled skin will vary, being thickest with cold molds and comparatively cool metal, and thinnest when both the molds and the metal are hot. Although little or no trace of dendrites will be evident, the solidification follows the rule described above except that, as the first metal will solidify at the mold wall, the dendrite growth will proceed only toward the interior of the mold cavity. Further, as many dendrites grow close together, there will be little chance of sending out axes at right angles to the main axis. If examined under a microscope, the individual grains will generally appear as fine needles with little or no branching.

Solidification Rate Retarded

When the mold has warmed up sufficiently, the rate of solidification will have slowed down, thus permitting more time for grain growth. At this time a second solidification zone will be inaugurated. The longer of the needle-like grains in the chilled zone will continue their growth, still at right angles to the mold walls and extending out into the liquid. Because of the slower growth, these dendrites will send out more and more secondary axes, which in turn will stop the growth of the shorter needles of the chilled zone.

At some later time during the solidification, there may be formed a third zone where the temperature of the whole remaining mass of liquid metal has fallen to the point where it is about to solidify. In this zone, crystallization will begin spontaneously at numerous points throughout the whole mass of liquid metal. As this growth takes place entirely within the body of the molten metal, the individual dendrites will start their growth in a haphazard manner and continue in all directions, but each will follow the rule of straight axes and right angles.

(*Concluded on page* 126)

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(*Concluded from page* 124)

Not being hindered in any direction, they will grow until the axes come into contact with other dendrites. When they attain sufficient size and weight to overcome the viscosity of the liquid they will tend to settle until they come into contact with other solid metal. The free axes will continue to grow until further increase in length is barred by contact with other solid metal.

(*To be concluded next month*)

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1. "Some Causes for Porosity and Leakage in Non-Ferrous Castings." *Transactions*, AFA, Vol. 49, 1941.

Note—The opinions expressed herein are those of the author, and not necessarily those of the Navy Department.

OBITUARY

SAMUEL P. BUSH, 84, former president of the Buckeye Steel Castings Co., Columbus, O., died there Feb. 8. Mr. Bush was graduated from the Stevens Institute of Technology and was first employed as a machinist's apprentice with the Pennsylvania Railroad at Logansport, Ind. He became a molder's apprentice at the railroad's shops in Columbus and later rose to assistant engineer of motive power. He was president of Buckeye Steel Castings Co. from 1922 to 1927, when he retired.

* * *

L. E. Nutt, 73, founder and president of Moline Iron Works, Moline, Ill., died Jan. 24. Mr. Nutt entered industry at an early age as car unloader and stockroom boy with Columbia Carriage Co., Hamilton, O. In 1902 he supervised construction of the Velie Carriage Co. factory at Moline and in 1917 purchased controlling interest of the H. W. Cooper Saddlery Hardware Mfg. Co., which became Moline Iron Works in 1919.

* * *

John R. Raible, 74, president of the Fanner Mfg. Co., Cleveland, died there Mar. 4. Mr. Raible was born and educated in Cleveland and purchased the Fanner company in 1907. He was a member of the board of directors of A. C. Williams Co., Ravenna, O., Cleveland Co-operative Stove Co. and Penton Publishing Co., Cleveland.

* * *

Gordon S. Rentschler, 62, board chairman of the National City Bank, New York, died at Havana, Cuba, Mar. 3. A native of Hamilton, O., Mr. Rentschler at one time was head of the Hooven, Owens, Rentschler Co., later a part of the General Machinery Corp., Hamilton. General Machinery recently was merged with Lima Locomotive Works to form the Lima-Hamilton Corp.

* * *

Frank M. Meyers, foundry consultant, died Oct. 13, 1947, in San Mateo, Calif. Mr. Meyers served his apprenticeship with Allis-Chalmers Mfg. Co., Milwaukee. Later he was in charge of foundries of the U. S. Navy Yard, Bremerton, Wash., manager of Maynard Electric Steel Castings Co., Milwaukee, and associated with Otis Steel Co., Cleveland.

* * *

George E. Clark, metallurgist, Cummins Engine Co., Columbus, Ind., died Feb. 18. Mr. Clark, a graduate of University of Detroit, was previously associated with Steel Sales Corp., Detroit, Kelsey-Hayes Wheel Corp., Detroit, Ecorse Foundry Co., Ecorse, Mich., and Campbell Wyant & Cannon Foundry Co., Muskegon, Mich.

* * *

Paul W. Arndt, 82, retired president of the former North End Foundry Co., Milwaukee, died Feb. 16, in Wauwatosa, Wis. Mr. Arndt was born in Germany and had resided in the United States since childhood.

* * *

Joseph Meinberg, 64, superintendent of the King Machine Tool Division of American Steel Foundries, Cincinnati, died suddenly Feb. 19. Mr. Meinberg had been an employee of the tool company for 43 years.

* * *

Ernest Baldwin, 63, owner and president of Spalding Foundry Co., Atlanta, died suddenly Feb. 23. Mr. Baldwin, a native of Nashville, Tenn., had been in the foundry industry for 40 years.

* * *

Philip H. Hortz, 66, assistant superintendent, Eastern Malleable Iron Co., Wilmington, Del., died there Feb. 19. Mr. Hortz was born in Philadelphia and went to Wilmington in 1904.

* * *

Andrew J. Dargis Sr., 64, associated with the molding department of Moore Bros. Co., Elizabeth, N. J., for 45 years, died Jan. 26, following a brief illness.

* * *

Clarence R. Morpeth, president and treasurer of the Providence Foundry Co., Providence, R. I., for several years, died Jan. 28.

* * *

Harry W. Reade, 56, apparatus sales manager, Air Reduction Sales Co., New York, died suddenly Feb. 15, at Jersey City, N. J. Mr. Reade was associated with Davis-Bournonville Co., Jersey City, when it was acquired by Air Reduction Sales Co.

* * *

Charles A. Rice, 76, owner of Rice Brothers Foundry & Machine Works, Kingston, N. Y., died Jan. 30. Mr. Rice had been a foundryman and machinist for more than 50 years.

* * *

L. B. Mihlbaugh, 74, who retired three years ago after being associated since 1936 with the Otis works of Jones & Laughlin Steel Corp., Cleveland, died in that city Mar. 7.

* * *

Edward N. Hurley Jr., 55, chairman, Thor Corp., Cicero, Ill., formerly the Hurley Machine Division, Electric Household Utilities Corp., died Feb. 25 in Wheaton, Ill.

* * *

Leo J. Messinger, 51, manager, George Birkenstein & Co., Chicago, died Feb. 26 in that city. He had been associated with the company since 1941.

* * *

Thomas A. Reynolds, for 30 years superintendent of McConway & Torley Corp., Pittsburgh, until his retirement 5 years ago, died Feb. 4.

* * *

Carl L. Mattison, 61, president, Mattison Machine Works, Rockford, Ill., died Mar. 3 of a heart attack at his winter home in Laguna Beach, Calif.

* * *

Patrick J. Flaherty, 69, chairman of the board of directors, Johnson Bronze Co., New Castle, Pa., died Feb. 12, at his winter home in Miami, Fla.

* * *

H. P. Maughlin, of the H. P. Maughlin Co., Columbus, O., and one of the veterans in the pattern business, died Feb. 11.

* * *

Edward J. Fitzpatrick, 75, former owner of an iron foundry in Yonkers, N. Y., died there Feb. 24.

* * *

William Harty, 69, executive vice president, Canadian Car & Foundry Co., Montreal, died Feb. 12.

* * *

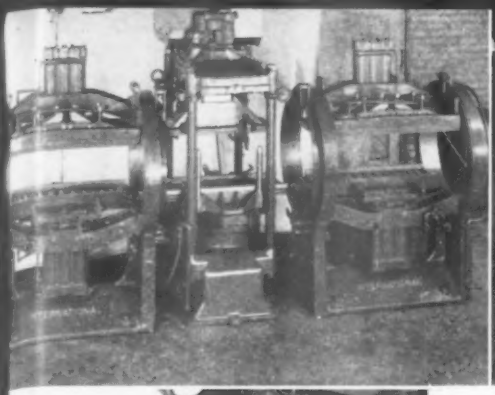
Joseph L. Long Sr., president, Atlas Foundry & Machine Co., Tacoma, Wash., died Jan. 29.

* * *

W. Alfred Dielhenn, 72, president, Massillon Refractories Co., Massillon, O., died recently.

* * *

Emery R. Bales, secretary-treasurer, the Wilmington Casting Co., Wilmington, O., died Jan. 16.



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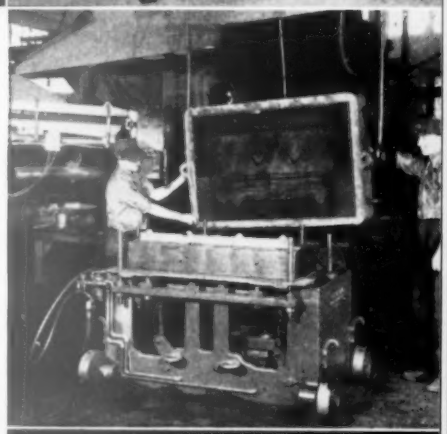

MAN-TO-MAN
on the Molder's Bench

"Sink or Swim"

I have been pecking away at a fine young fellow I know, trying to swing him over to the foundry industry as a career. From what little he'd seen by peeping into foundries now and then he wasn't any too hot on the idea. I tried to tell him how important the foundry was to all industry and how important I thought it always would be. I also pooh-poohed the smoke, heat and dirt as being just one of those things like wading around in the mud to a civil engineer, analysing specimens to a doctor or climbing high in cold weather to a building contractor. I said that because the foundry is a bit startling at first sight and somewhat short on sex appeal a lot of panty-waists were scared away from it.

Since my friend had been a little kid he'd always liked to work in wood, so he came back from the Army with cabinetmaking in mind. After talking to quite a few people about it the prospects didn't look so good to him. Then it struck him that in view of what I'd been telling him about the foundry industry, together with his love of woodworking, that pattern making as a career would just about fill the bill.

When he told me of his decision I patted him on the back but pointed out that he simply must put in some time in the foundry before he tackled patternmaking.

I called up a friend of mine who runs a foundry and pattern shop. Without any ado he told me to send the young man up to see him, which I did. He was received with open arms by the manager, who talked to him personally for 15 or 20 minutes. Then he introduced him to a fellow who headed up veteran training. This cookie gave him a two hour, double barreled selling on prospects in the foundry business, the need for management material and the training setup they had for breaking a young fellow into the business. The conference ended with my friend having a job and a date to report for work the following Monday. It wasn't till after he got home that it dawned on him that patternmaking was pretty much lost sight of in the shuffle. This worried him too, for

By RALPH L. LEE

the old woodworking bug was still gnawing at him.

I had a chat with Bud the other day, two weeks after he started to work, and found him pretty much down in the dumps, in fact just about ready to chuck the whole thing overboard. He told me of reporting to work that Monday. The employment department turned him over to a foreman who, after a five-minute visit, turned him over to a straw boss in the coreroom.

Before Bud could say Jack Robinson he found himself stacking heavy cores right next to the oven at a rate that had his tongue hanging out in short order. By the end of the first week he was thoroughly pooped but, with little or no explanation, he was promoted to cleaning hefty cast iron core driers.

As Bud was telling me of his experience he kept eyeing me with an expression that said just as plain as words, "What a pal you turned out to be."

"Now look son," I said, "you take that foundry of yours—". "My foundry?" he barked back, "Never, I don't want her—you can have her—she's too tough for me."

"But," I went on, "cores, core driers and the work that goes with them is part and parcel of the foundry business and it takes some time before you—". "Now look, Mr. Lee," Bud said, "I'm not afraid of hard work, I've done plenty of it, and I expect to do a whole lot more, but I'll be doggoned if I do it without knowing what it's for and where it fits into the picture.

"After the two-hour selling they gave me, I at least thought they would take me through the foundry and pattern shop so I could get some idea as to what I was getting into. They didn't even show me what they were making, let alone take me around in the coreroom where I was going to work. They just pitched me headlong into the hardest, most uninteresting work I have ever done in my life without giving me any idea of the work program they had planned for me."

I am very much afraid that Bud is going to quit no matter what I say to him, and in a way I don't blame him. Anyway I'm glad I ran into this experience, for it points out to me, at least, what could be one of the weakest links in the chain we are trying to forge for pulling fine young material into the business—*the foundry initiation ceremony.*

What good is it going to do if after providing co-operative programs for college students, soliciting high school graduates, putting in foundry departments in our schools and doing everything we know how to do to coax young people into our business, we toss them head over heels into the pool and let them sink or swim?

I know from visiting foundries all over the country that Bud's experience is not the rule throughout the industry but I also know its not the exception by any means. If I had my way we wouldn't even put on a shakeout man without first taking him through the plant, yes even the offices. What would it cost to show every one who works with us what we make, how it is done and how the work each of us does is vital to the entire program?

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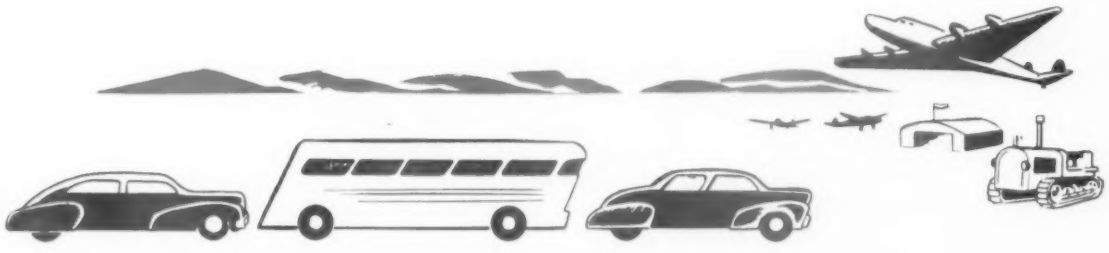

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Pilot installations show that foundrymen can expect considerable operating economy with this new twin furnace.

At last, you can have a *top fired* crucible furnace which combines TWO furnaces into ONE complete production unit. Randall-Twin pays for itself.

Twin melting furnaces are interconnected. While top firing one of the twin furnaces "A," the charge in the crucible of furnace "B" is being preheated by waste heat from "A." After pouring and recharging the crucible in "A," furnace "B" is top fired thus reversing the process and the charge in furnace "A" is preheated.

With gas at 19 C. F. M. a heat is pulled from a No. 70 crucible every 20 to 25 minutes.

Each furnace has a separate cover and the furnace tender can charge each furnace in the conventional manner. Nothing new to learn.

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Foundry Developments

By EDWIN BREMER

PROCESS developed in Germany for obtaining castings with extremely smooth surfaces and close dimensional tolerances is described in report PB-81284, available from the Office of Technical Services, Department of Commerce, Washington 25, for 25 cents. Molding material is composed of 92 to 94 per cent silica sand of approximately 90 to 100 AFA fineness, and 6 to 8 per cent phenolic resin binder. It is placed on an oiled pattern plate heated to 360 to 400°F, allowed to remain about 6 sec, and the excess dumped, leaving a thin shell about 0.012 to 0.16-in. adhering to the pattern plate. Pattern and shell then are heated to 570°F for 2 or 3 minutes, hardening the shell which then is removed. Cores are made in much the same manner except that the molding material is blown into the hot corebox by compressed air. Excess material falls out when air flow stops, leaving a hollow core of same thickness as mold.

Molds are formed by pasting two half molds together. These are placed in a flask and the surrounding space is filled with steel shot or some other suitable bedding material. Hot metal burns plastic binder to carbon, and gases generated pass through mold shell readily. Mold and cores offer little resistance to contraction during solidification, and danger of crack and hot tear formation is minimized. Casting is removed easily from mold as no burning in or sticking of sand to casting surface occurs. Cores can be removed by lightly tapping the casting. Bedding material is returned to bin for reuse. Process may be employed for production of ferrous and nonferrous castings. Steel castings with sections as thin as 1/10-in. can be cast.

* * *

MAGNESIUM die casting techniques used by the Mahle Co., Germany, are discussed in two reports available from the Office of Technical Services, Department of Commerce, Washington 25. Hot chamber die casting machines are used; castings up to 1 lb being made on piston machines and larger ones up to 13 lb on compressed air machines. One report (PB-1251, "Metallurgical and Industrial Developments in Magnesium"; mimeograph, $3.25), indicates that Mahle techniques may be of interest to American industry in the development of new and wider uses of magnesium parts in the automotive and other fields. The other (PB-1251-s, "The Mahle Die Casting Machine", mimeograph, 25 cents) presents an opposite view.

* * *

IMPROVED method for measuring small amounts of water vapor in gases which may be applied to molding sand, soil and other solids, has been developed by R. E. Weaver, National Bureau of Standards. Procedure depends essentially on the change in electrical resistance of an electrolytic film as it absorbs water. Detector is a thin film of phosphoric acid or a solution of sulphuric acid or other electrolytic compounds in a gelatin or plastic binding material spread over the surface of a solid insulator between metallic electrodes. Other apparatus includes an indicating circuit involving an adjustable bridge with power supply and amplifying device, and a galvanometer or microammeter. With a solid such as molding sand the water is absorbed in acetone, and the detector held within a few millimeters above the surface, or dried air is passed through the sand into a cell containing the detector.

* * *

HIGH-TEMPERATURE ceramic coatings for steel developed by the National Bureau of Standards embody several outstanding features including high resistance to chipping under repeated severe thermal shock, protection of the metal against oxidation during prolonged exposure in air at temperatures up to about 1250°F, freedom from cracking and blistering produced in conventional porcelain enamels under comparable conditions of high temperatures and severe thermal gradients, and a mat surface which does not show highlights and therefore decreases visibility. One of the coatings, known as A-19, consists of 50 parts of a relatively "soft" or fusible frit, 50 parts of a relatively "hard" or infusible frit, 25 parts calcined alumina, 10 parts enamelers clay, and other minor ingredients.

* * *

NEW DEPARTURE in investment molding procedure recently has been reported. Novelty is use of mercury as the pattern material instead of wax or synthetic resin. In the new process the mercury is poured into the pattern mold or die and subjected to temperatures 50 to 75 below zero which solidifies the mercury. Solidified pattern then is treated as a wax pattern would be—covered with investment material. When the investment has set, the mercury presumably has returned to its normal liquid state and is poured out for reuse. The mold then is baked at 1000°F to remove all moisture, and the metal poured. While no information is available on why mercury is used, one might hazard the following: It is liquid at ordinary temperatures, has a high specific gravity and high fluidity which permits pouring easily out of the mold cavity even through narrow channels, and it leaves no residue in the mold.

* * *

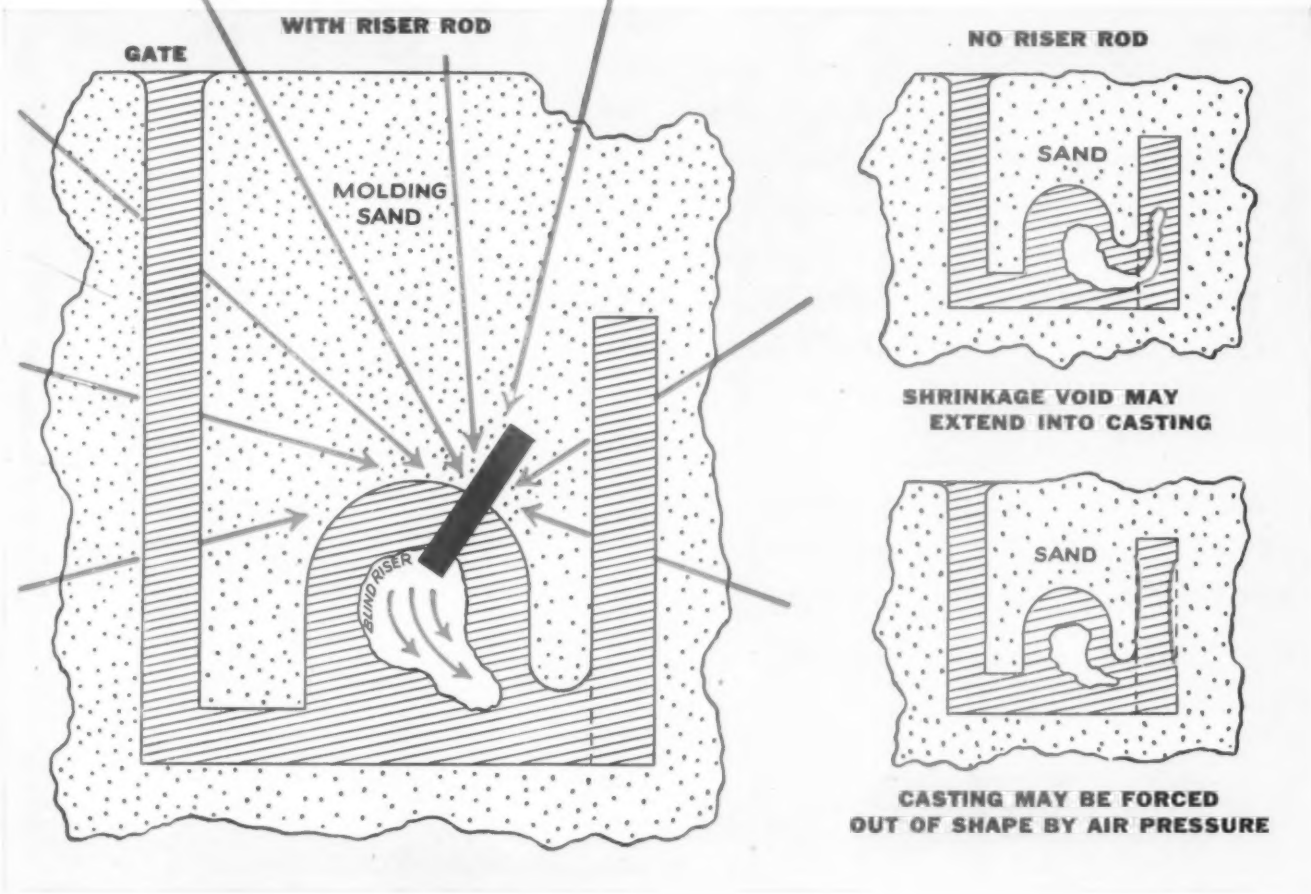
FOUNDRYMEN in the ferrous branch undoubtedly will be interested in a recent news release from the American Iron & Steel Institute which points out that, because of raw material difficulties, the six major pig iron producing firms experienced a loss of 80 tons of pig iron per day from each 1000-ton furnace, or slightly over 29,000 tons per furnace a year. Losses in production are attributed to poor quality of coking coal and scarcity and poor quality of scrap of blast furnace grade. Poor coke increased the quantity required to produce a ton of pig iron, and also increased the amount of limestone needed. Those increases in consumption decreased the amount of air that could be blown into the furnance with a consequent loss in production.

* * *

BY COMBINING their research facilities a manufacturer of tin plated bearings and a producer of colliodal graphite dispersions have developed a coating material for "stopping off" in selective hot dip tin plating. Coating is said to be applied easily where needed to prevent adhesion of tin, and will withstand the muriatic pickling bath used as well as the fluxing dip and molten tin dip.

Air pressure feeds your casting with sound metal!

(WHEN YOU USE "NATIONAL" GRAPHITE RISER RODS)



● By inserting a "National" graphite riser rod into the mold—as shown above—you keep the blind riser open to the atmosphere during solidification of the metal. The red arrows show how air pressure pushes powerfully through this hole. It forces molten metal into the casting with considerable force.

The result: Air pressure works *for* you—not *against* you. Air pressure does not warp the casting out of shape, as it might if there were no riser rod to relieve the internal shrinkage. Air pressure packs metal where a vacuum tries to exist, and the shrinkage void is left in the riser...not in the casting. The result is a sound, true-to-shape casting.

You can buy "National" graphite riser rods in standard sizes... from the smallest to the largest. They reach you in a handy package, all ready to place in the mold. "National" graphite riser rods save time because they are so easy to use. They do a better job than other rods because they keep riser metal fluid longer—force-feed more metal into the casting.

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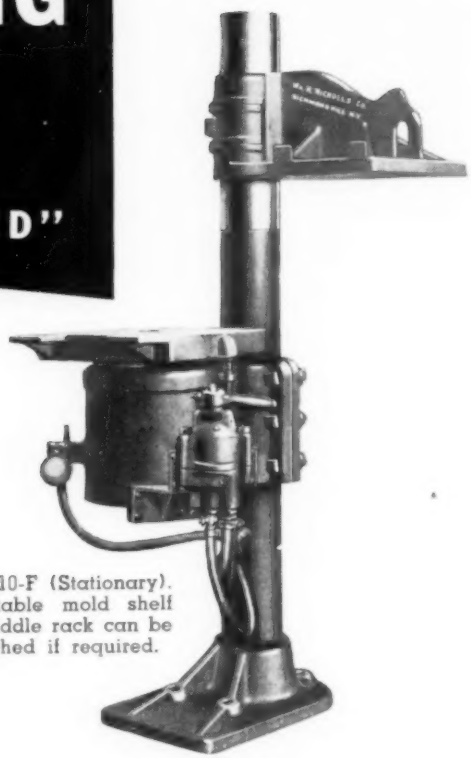

Type 10-F (Stationary). Adjustable mold shelf and riddle rack can be attached if required.

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These combination Jolt and Power Squeezers eliminate hand ramming or peening with less effort and save the energy of your foundrymen. It will pay you to investigate the BIG OUTPUT and LOW UPKEEP of these precision-built machines.

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NICHOLLS

TENTATIVE SPECIFICATIONS FOR ALUMINUM-BASE ALLOY PERMANENT MOLD CASTINGS

ASTM Designation: B 108-47 T. Issued, 1936; Revised 1937, 1938, 1941, 1943, 1944, 1946, 1947

1. These specifications cover aluminum-base alloy permanent mold castings having a specific gravity of 3 or less. Sixteen alloys are specified and are designated as shown in Table I. (See table of supplementary data in the Appendix.)

2. The responsibility of furnishing castings that can be laid out and machined to the finished dimensions within the permissible variations specified, as shown on the blueprints or drawings, shall rest with the manufacturer, except where mold equipment is furnished by the purchaser. Sufficient stock shall be allowed for shrinkage and, where required, for finishing; but castings of excessive size or weight shall not be furnished.

3. The alloys shall conform to the requirements as to chemical composition prescribed in Table I.

4. (a) Samples for chemical analysis shall be selected, so far as possible, by heats or melts, or groups of heats or melts, unless otherwise agreed upon by the manufacturer and the purchaser.

(b) The sample for chemical analysis shall be taken by sawing, drilling, or milling the casting or test specimen in such a manner as to be representative of the material.

(c) The saw, drill, cutter, or other tool used for taking the sample shall be thoroughly cleaned. No lubricant shall be used in the operation, and the sawings or metal chips shall be carefully treated with a magnet to remove any particles of iron introduced in taking the sample.

5. The chemical analysis shall be made in accordance with the Standard Methods of Chemical Analysis of Aluminum and Aluminum-Base Alloys (A.S.T.M. Designation: E 34), or by any other approved method agreed upon by the manufacturer and the purchaser. The analysis may be made spectrographically, provided that, in case of dispute, the results secured by Methods E 34 shall be the basis for acceptance.

6. The tension test specimens representing the castings shall conform to the requirements as to tensile properties prescribed in Table II, except as noted.

7. The tensile properties shall be determined in accordance with the Standard Methods of Tension Testing of Metallic Materials (A.S.T.M. Designation: E 8).

8. (a) The tension test specimens shall be separately cast in a permanent mold. The specimens shall have a gage section diameter of 0.505 ± 0.010 in., and a gage length of not less than 2¼ in. The radius of fillet shall be not less than ½ in. A larger radius is not objectionable. The gage section diameter may be slightly reduced in the middle to promote breaking in this area.

(b) If the castings are to be heat treated, the test specimens representing such castings shall be heat treated with the castings they represent. They shall not be machined prior to test except to adapt the grip ends of

TABLE I.—CHEMICAL REQUIREMENTS

Alloy	Aluminum, per cent	Copper, per cent	Iron, max., per cent	Silicon, per cent	Manganese, max., per cent	Magnesium, per cent	Zinc, max., per cent	Chromium, max., per cent	Titanium, max., per cent	Nickel, max., per cent	Other Elements, max., per cent Each	Other Elements, max., per cent Total
S1	remainder	0.1 max.	0.8	$5.0^{+1.0}_{-0.5}$	0.3	0.05 max.	0.3	..	0.2	..	0.05	..
S2	remainder	0.3 max.[a]	0.8	$5.0^{+1.0}_{-0.5}$	0.3	0.05 max.	0.3	0.2	0.2	..	...	0.3
CG1	remainder	10.0±0.8	1.5	2.0 max.	0.5	0.25±0.10	0.5	..	0.2	0.3	...	0.3
CN21	remainder	4.0±0.5	1.0	0.7 max.	0.3	1.5±0.3	0.3	0.2	0.2	2.0±0.3	0.05	0.15
CS4	remainder	4.5±0.5	1.2	2.5±0.5	0.3	0.05 max.	0.3	..	0.2	0.3	...	0.3
CS21	remainder	9.5±0.5	1.5	4.0±0.5	0.5	1.0±0.5	0.5	..	0.2	1.0	...	0.5
CS22	remainder	7.0±1.0	1.4	2.5±1.5	0.5	0.07 max.	2.5	..	0.2	0.3	...	0.5
CS23	remainder	6.5±1.0	1.5	5.5±0.5	0.8	0.4±0.2	0.8	..	0.2	..	...	0.8
GS1	remainder	0.3 max.[b]	0.6[b]	1.8±0.4	0.8[b]	4.0±0.5	0.3	0.2	0.2	..	0.05	..
GZ1	remainder	0.3 max.[b]	0.6[b]	0.3 max.	0.8[b]	4.0±0.5	1.8±0.4	..	0.2	..	0.05	..
SC1	remainder	4.5±0.5	1.0	5.5±0.5	0.3	0.1 max.	0.5	..	0.2	..	...	0.5
SC8	remainder	$3.5^{+1.0}_{-0.5}$	1.2	$6.0^{+1.0}_{-0.5}$	0.5	0.15 max.[c]	1.0	..	0.2	0.3	...	0.5
SC21	remainder	1.25±0.25	0.8[d]	5.0±0.5	0.5[d]	0.5±0.1	0.3	0.2	0.2	..	0.05	0.15
SC41	remainder	1.5±0.5	0.9	12.0±1.0	0.7±0.2	0.7±0.3	0.4	..	0.2	0.05	...	0.5
SG1	remainder	0.2 max.	0.6	7.0±0.5	0.3	0.3±0.1	0.3	..	0.2	..	0.05	0.15
SN41	remainder	1.0±0.5	1.3	12.0±1.0	0.1	1.0±0.3	0.1	..	0.2	2.5±0.5	0.05	..

[a] For general use, other than cooking utensils, the copper content may be 0.6 per cent, max.
[b] If the copper content plus the iron content exceeds 0.5 per cent, a manganese content of at least 0.3 per cent is desirable.
[c] If agreed upon by the manufacturer and the purchaser, a magnesium content of 0.5 per cent, max., is permissible.
[d] If the iron content exceeds 0.4 per cent, it is desirable to have manganese present in an amount equal to one-half of the iron.

NOTE 1.—Analysis shall regularly be made only for the elements specifically mentioned in this table. If, however, the presence of other elements is suspected, or indicated in the course of routine analysis, further analysis shall be made to determine that the total of these other elements is not present in excess of limits specified in the last column of the table.

NOTE 2.—The following applies to all specified limits in this table: For purposes of acceptance and rejection, an observed value or a calculated value obtained from analysis should be rounded off to the nearest unit in the last right-hand place of figures used in expressing the specified limit.

TENTATIVE SPECIFICATIONS FOR ALUMINUM-BASE ALLOY PERMANENT MOLD CASTINGS

ASTM Designation: B 108-47 T. Issued, 1936; Revised 1937, 1938, 1941, 1943, 1944, 1946, 1947

the specimen to the jaws of the testing machine in such a manner as to assure axial loading.

9. (a) The tension test specimens shall, so far as possible, be selected by heats or melts but, unless otherwise agreed upon by the purchaser and the manufacturer, two tension tests shall be made for each unit of 1000 lb or fraction thereof, of clean castings.

(b) If any test specimen shows defective machining or flaws, it may be discarded; in which case the purchaser and the manufacturer shall agree upon the selection of another specimen in its stead.

10. If the results of the tension tests do not conform to the requirements prescribed in Table II, the castings may be reheat-treated but not more than twice. The results of acceptable tests shall conform to the requirements as to tensile properties specified in Table II.

11. The finished castings shall be uniform in composition and free from blowholes, cracks, shrinks, and other injurious defects.

12. (a) Inspection may be made at the manufacturer's works where the castings are made, or at the point at which they are received, at the option of the purchaser.

TABLE II.—TENSILE REQUIREMENTS**

Alloy	Condition	Tensile Strength, min., psi.	Elongation in 2 in., min., per cent
S1	As cast	21,000	2.5
S2	As cast	21,000	2.0
CG1	Aged (Heat treatment No. 1)	30,000	*
	Solution treated and aged (Heat treatment No. 2)	40,000	*
CN21	Aged (Heat treatment No. 1)	34,000	*
	Solution treated and aged (Heat treatment No. 2)	40,000	*
CS4	Solution heat treated (Heat treatment No. 1)	33,000	4.5
	Solution treated and aged (Heat treatment No. 2)	35,000	2.0
	Solution treated and over-aged (Heat treatment No. 3)	33,000	3.0
CS21	As cast	*	*
CS22†	As cast	23,000	*
CS23	Aged	27,000	*
GS1	As cast	*	*
GZ1	As cast	22,000	2.5
SC1	As cast	23,000	*
SC8	As cast (Heat treatment No. 1)	26,000‡	2.0‡
	Solution treated and aged (Heat treatment No. 2)	33,000§	4.0§
SC21	Solution treated and aged	37,000	1.5
SC41	Aged (Heat treatment No. 1)	32,000	*
	Solution treated and aged (Heat treatment No. 2)	36,000	*
SG1	Solution treated and aged	33,000	3.0
SN41	Aged (Heat treatment No. 1)	31,000	*
	Solution treated and aged (Heat treatment No. 2)	40,000	*

** If agreed upon by the manufacturer and the purchaser, other physical properties may be obtained by other heat treatments such as annealing, aging, or stress relieving.

* Not required.

† Formerly designated as alloy C3.

‡ If the magnesium content exceeds 0.15 per cent, these values may be 28,000 psi. and 1.5 per cent, respectively.

§ When the magnesium content exceeds 0.15 per cent, these values may be 34,000 psi. and 2.0 per cent, respectively.

(b) The general requirements specified in Section 11 shall be checked by visual inspection of the castings or by comparison with observational standards where such standards are established. It is advisable that observational standards representing acceptable material be established which will govern when any question arises as to what defects are permissible under the best commercial practice.

(c) If the purchaser elects to have inspection made at the manufacturer's works, the manufacturer shall afford the inspector representing the purchaser all reasonable facilities to satisfy him that the material is being furnished in accordance with these specifications. All tests and inspections shall be so conducted as not to interfere unnecessarily with the operation of the works.

13. Castings that show injurious defects revealed by machining operations subsequent to acceptance may be rejected, and if rejected shall be replaced by the manufacturer without charge to the purchaser. The full weight of the original material rejected shall be returned to the manufacturer.

14. In the case of dissatisfaction regarding rejections based on chemical composition and tensile property requirements as specified in Sections 3 and 6, respectively, the manufacturer may make claim for a rehearing as a basis of arbitration within a reasonable time after receipt by the manufacturer of the rejection notification.

APPENDIX

The data in the following table are approximate and are supplied for general information only

TABLE OF SUPPLEMENTARY DATA

Alloy	Former Alloy Designation	Approximate Specific Gravity	Corrosion Resistance	Casting Properties	Response to Heat Treatment	Principal Uses	Machinability
S1	9A	2.69	Excellent	Good	No	General with maximum corrosion resistance	Fair
S2	9	2.69	Good	Good	No	General and cooking utensils	Fair
CG1	4	2.95	Fair	Good	Yes	Pistons and castings requiring high Brinell hardness	Excellent
CN21	11	2.81	Good	Fair	Yes	Aircraft and Diesel engine pistons	Good
CS4	1A	2.78	Good	Good	Yes	General, where high strength and high ductility are required	Good
CS21	..	2.95	Fair	Good	No	Flat iron sole plates	Very Good
CS22	C3	2.91	Fair	Good	Yes	General automotive cylinder heads and washing machine agitators	Excellent
CS23	..	2.89	Fair	Good	Yes	Pistons and other high hardness applications	Good
GS1	..	2.65	Excellent	Fair	No	Cooking utensils and pipe fittings	Excellent
GZ1	..	2.65	Excellent	Fair	No	Cooking utensils and castings to resist atmospheric corrosion	Excellent
SC1	3	2.79	Fair	Excellent	No	General	Good
SC8	..	2.77	Fair	Good	Yes	General purpose castings	Good
SC21	..	2.70	Good	Excellent	Yes	Aircraft engine crankcases, oil pans, liquid cooled cylinder heads and other intricate high-strength castings	Very Good
SC41	7	2.68	Good	Fair	Yes	Pistons	Fair
SG1	10	2.68	Excellent	Excellent	Yes	General where high strength and corrosion resistance are required	Good
SN41	6	2.68	Good	Fair	Yes	Pistons	Fair

THE Redford CORE BLOWER

CARTRIDGE BENCH TYPE

Users report remarkable increases in quality and quantity of production

When making cores from horizontally split boxes, the work of placing driers and drawing the box is done on the base of the machine

HUNDREDS OF FOUNDRIES ALL OVER THE WORLD ARE USING **REDFORDS** AS AN EFFICIENT LOW COST MEANS OF PRODUCING SMALL INTRICATE CORES

WRITE FOR

complete details and new booklet.

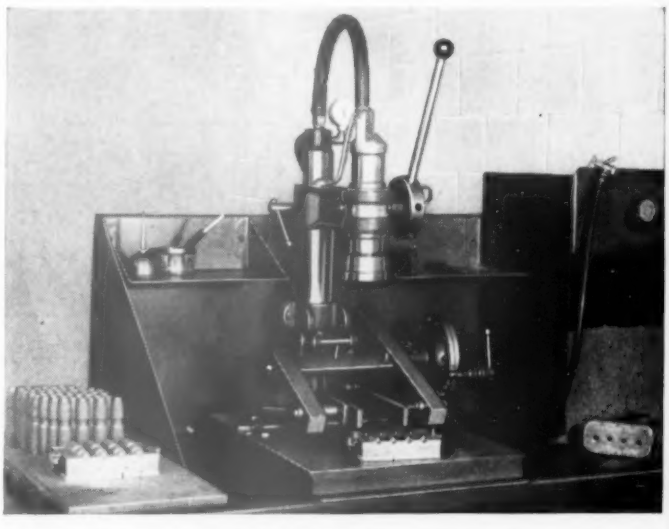
FILLS NEED FOR SIMPLE, FLEXIBLE CORE BLOWER

The Redford Core Blower has been accepted by cost-conscious foundrymen everywhere because it supplies an important need in the foundry for an efficient, low-cost method of blowing small, intricate cores. It requires no large volume of air and readily lends itself to handling a variety of core boxes. In fact, they tell us that it is the ideal method of making cores in single or gang boxes requiring a maximum of 2 lbs. of sand.

SAND CARTRIDGES AVAILABLE IN 12 STANDARD SIZES

Blower comes complete, ready to use. Each blower provided with one Size "C" sand cartridge which is adaptable to a large range of core boxes. Cartridges are available in 11 additional standard sizes and special sizes furnished where needed.

WE HAVE THE "KNOW HOW" AND WILL ASSIST YOU IN SOLVING YOUR CORE BLOWING PROBLEMS



The new air operated core box clamping attachment is used for the blowing of cores in vertically split boxes. Permits clear working space on machine base—simple to install, operate and adjust—can be swung to one side to clear base for blowing horizontally split core boxes.

Redford IRON & EQUIPMENT CO.

PHONE: REDFORD 8611

21315 W. McNICHOLS ROAD • DETROIT 19, MICHIGAN

GRAY IRON CASTINGS INDUSTRY

(*Continued from page* 91)

lieved that lump sum pricing has largely disappeared from the industry in recent years.

Cost Accounting — 467 foundries stated they use a cost system in estimating new jobs. About the same number (464) reported the use of a cost system in determining actual production costs. Two hundred forty-nine (249) foundries say they are using the cost system developed by the Gray Iron Founders' Society, while 57 report that they use their own system.

It could be inferred from the above figures that nearly 25 per cent of the foundries do not use any cost system and that another 25 per cent are using empirical cost formulas of their own to guide them. In any circumstance, there appears to be a fertile field for the promotion of sound cost accounting procedures in this industry.

Industry Competition—Following is a list of materials and fabricating methods reported as competitive with gray iron castings. The list is arranged according to the number of times each competitive product or process was mentioned. Figures in parenthesis indicate the number of times the item was mentioned.

Steel weldments (101), aluminum castings (67), steel castings (57), stampings and pressings (39), die castings (22), malleable castings (18), brass and bronze castings (16), forgings (15), plastics (12), permanent mold castings (4), cement and concrete (4), magnesium castings (2), terra cotta (2), powdered metal (1).

Nearly all of the above 14 distinct products or processes could become very series competitors for what is now gray iron castings business. At least a third of them must be considered keenly competitive at present.

Sales Promotion — Table XIII shows the number of foundries engaged in trade paper advertising, direct mail and other sales promotional activities, and the amounts spent per year on each type. Most gray iron foundries are doing nothing whatsoever in the way of advertising and sales promotion.

While the total expenditures for advertising listed in the table may seem large, they are small when compared to those of competitive industries. For example, producers in one branch of the foundry industry, whose annual sales are about one-fourth that of this industry, are spending more than these amounts on individual company advertising, and their trade association plans to spend upward of $50,000 per year in

(*Continued on page* 141)

TABLE XIX—Number of Different Size Cupolas Operated

Size—Tons Per Hour	Jobbing Foundries	Captive Foundries	Total
⅝	1	0	1
1	8	0	8
1¼	0	3	3
1½	13	0	13
2	35	6	41
2½	9	0	9
3	62	12	74
3½	16	3	19
4	51	9	60
4½	8	2	10
5	93	16	109
5½	3	2	5
6	65	7	72
6½	9	0	9
7	54	4	58
7½	12	3	15
8	56	6	62
8½	1	0	1
9	41	7	48
9½	1	0	1
10	92	26	118
10½	3	0	3
11	8	8	16
11½	2	1	3
12	48	18	66
13	4	1	5
14	22	3	25
15	19	7	26
16	9	5	14
17	10	0	10
18	5	1	6
19	1	0	1
20	24	12	36
21	4	0	4
24	1	0	1
25	8	2	10
30	1	2	3
50	3	0	3
TOTALS	802	166	968

TABLE—XX—Number of Different Size Electric Furnaces Operated

Size—Pounds per Charge	Jobbing Foundries	Captive Foundries	Total
Under 100	4	0	4
200	1	0	1
250	1	0	1
300	1	1	2
500	1	4	5
650	1	0	1
800	0	2	2
1,000	6	1	7
1,300	3	0	3
1,500	3	0	3
2,000	7	0	7
3,000	2	1	3
4,000	0	1	1
4,500	0	2	2
6,000	2	2	4
9,000	1	0	1
10,000	1	0	1
TOTALS	34	14	48

TABLE XXI—Number of Different Size Air Furnaces Operated

Size—Pounds per Charge	Jobbing Foundries	Captive Foundries	Total
300	0	2	2
1,000	1	1	2
2,000	1	0	1
6,000	0	1	1
10,000	0	1	1
30,000	0	1 (Duplex)	1
35,000	1	0	1
40,000	1	0	1
50,000	1	0	1
60,000	2	0	2
TOTALS	7	6	13

TABLE XXIV—Lengths of Work Shifts in Gray Iron Foundries

Hours per Shift	Jobbing Foundries	Captive Foundries	Total
7	1	0	1
7½	0	1	1
8	389	79	468
8½	18	4	22
8 2/3	1	0	1
8¾	3	0	3
9	86	11	97
9½	9	0	9
10	6	5	11
10½	1	0	1
11	1	0	1

TABLE XXII—Research Conducted by Gray Iron Foundries

Type of Research	Jobbing Foundries: Number Conducting	Jobbing Foundries: Amount Spent Annually	Captive Foundries: Number Conducting	Captive Foundries: Amount Spent Annually	Total: Number Conducting	Total: Amount Spent Annually
Metallurgical	76	$235,664	12	$ 86,750	88	$322,414
Production or Processing	35	215,500	8	120,100	43	335,600
Market or Sales	21	63,800	4	11,200	25	65,000
Totals		$514,964		$218,050		$723,014

TABLE XXIII—Number of Shifts Operated Per Day Iron Foundries

Shifts Operated	Jobbing Foundries	Captive Foundries	Total	Per cent of Total
1	501	90	591	95.5
2	15	8	23	3.7
3	3	2	5	0.8

TABLE XXV—Days Worked Per Week—618 Gray Iron Foundries

Days Worked per Week	Jobbing Foundries	Captive Foundries	Total Number	Per cent of Total
5	376	72	448	72
5½	44	10	54	9
6	98	18	116	19

TABLE XXVI—Analysis of Labor Agreements As Reported by 392 Gray Iron Foundries

Union	Jobbing Foundries	Captive Foundries	Total
AFL—International Molders & Foundry Workers	147	22	169
AFL—Union not specified	49	13	62
AFL—United Mine Workers	7	2	9
AFL—Pattern Makers	2	0	2
CIO—United Steel Workers of America	32	11	43
CIO—United Automobile Workers	25	10	35
CIO—Union not specified	18	5	23
CIO—United Electrical Workers	12	4	16
CIO—United Farm Equip. Workers	4	0	4
Miscellaneous, Independent	15	5	20

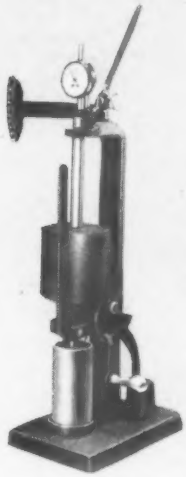
IF YOU WANT BETTER CASTINGS . . .

Control SAND-CORES-MOLDS

SAND

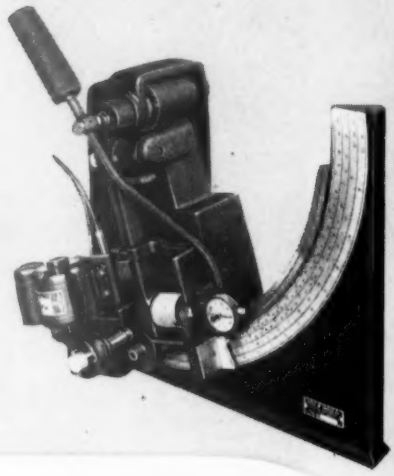
MOISTURE TELLER an instrument for either plant or laboratory which flash-dries sand samples for accurate moisture determination.

SAND RAMMER accurately reproduces the ramming of specimens to be tested for permeability, strength, density and flowability.



PERMMETER quickly and precisely determines the A.F.A. standard permeability of all molding materials. A direct reading unit.

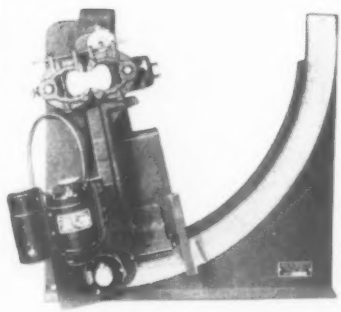
SAND STRENGTH MACHINE determines green or dry compression and shear strength of sand—also deformation to determine plastic strength. It is either indicating or recording.



CORES

BAKING OVEN provides accurate control of core baking for core research and binder testing.

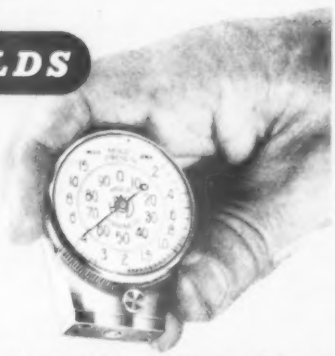
CORE PERMEABILITY TUBE is used with the Permmeter to determine the A.F.A. Permeability of baked cores and dried specimens.



TENSILE CORE STRENGTH ACCESSORY attached to the Sand Strength machine determines tensile strength of baked core specimens.

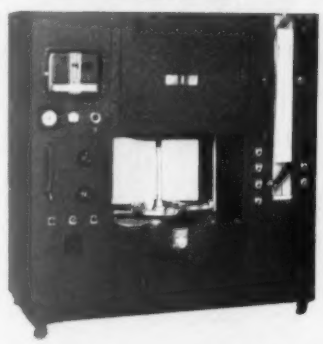
GAS DETERMINATOR measures volume of gas released by any core or molding sand mixture—used also to check baking practice.

MOLDS



MOLD HARDNESS TESTER determines hardness of green sand molds or green cores—also compressive strength of mold surface in psi.

CORE HARDNESS TESTER measures surface hardness of baked cores and dry sand molds.



DILATOMETER: a complete high temperature testing laboratory. Predicts behavior of sand and core during pouring, solidification and shakeout.

2951

HARRY W. DIETERT CO.

9330 ROSELAWN AVE., DETROIT 4, MICHIGAN

SAND · MOLD · MOISTURE · SULFUR · CARBON

Wherever steel is made...
DEPENDABILITY
PHILO
BRAND
QUALITY • SERVICE
DEPENDABILITY
RAINIER
BRAND
QUALITY • SERVICE
Chicago area mills will share largely in the steel industry's great billion-dollar expansion program.
Ohio Ferro-Alloys Corporation
Canton, Ohio
Chicago Detroit Pittsburgh San Francisco Tacoma

(*Continued from page* 138)

addition to the advertising expenditures of the individual members.

Miscellaneous types of sales promotion reported by foundries included: Catalogs, local advertising, trade shows, house organ, calendars, pencils and novelties. The total amount spent for these miscellaneous items was less than 2 per cent of the total spent for sales promotion.

Salesmen—130 jobbing foundries reported employing 235 full-time outside salesmen. Fifteen captive foundries reported employing 92 full-time outside salesmen. Jobbing foundries having outside sales representation averaged less than two salesmen per foundry. It would appear that less than one gray iron foundry in four employs full-time outside salesmen, indicating a need for other methods of sales promotion to supplement personal contacts with customers and prospects.

Development of New Uses—Only 37 foundries reported specific means employed for the purpose of developing new uses for gray iron. The list is an interesting one:

(a) Consistent contact with customers' engineers to explain how gray iron could cut costs, citing experiences of other customers in the same line of business.

(b) Promoting high strength gray iron to replace steel and malleable.

(c) Promoting special alloy irons to meet requirements of specific service applications.

(d) Set up special full-time metallurgical department to exploit markets for alloy and high test irons.

(e) Promoting gray iron from the standpoint of machinability for applications such as pistons and transmission cases, to replace light metals.

(f) Developing gray iron hand plow points.

(g) Manufacturing "garden chefs."

(h) Promoting special alloy irons to replace steel and boron-carbide in wear resisting applications.

(i) Adding items to sell to the hardware jobber trade.

(j) Giving metallurgical engineering service to customers.

(k) Exploiting rust resisting, acid resisting, insulating properties of gray irons.

(l) Developing higher tensile strength irons to compete with alternative materials.

(m) Developing new methods of producing welding rod.

(n) Introducing flame - hardened iron for drawing dies to replace steel.

(o) Offering to submit gray iron castings for comparison tests against other materials.

(*Continued on page* 145)

TABLE XXVII—Miscellaneous Labor Information—Gray Iron Castings Industry

Type of Agreement	Jobbing Foundries	Captive Foundries	Total
Closed Shop	79	13	92
Union Shop	102	19	121
Maintenance of Membership	83	16	99
Open Shop	185	43	228
Totals	449	91	540

TABLE XXVIII—Expiration Dates of 360 Labor Agreements in the Gray Iron Castings Industry

Month in which Agreement Expires	Jobbing Foundries	Captive Foundries	Total
January	19	5	24
February	11	2	13
March	35	6	41
April	55	7	62
May	42	14	56
June	35	6	41
July	14	6	20
August	4	0	4
September	9	2	11
October	10	4	14
November	13	2	15
December	47	12	59
Totals	294	66	360

TABLE XXIX—Incentive and Bonus Plans in Gray Iron Foundries

Type of Plan	Foundries	Foundries	Total
Incentive—for Foremen	64	10	74
Incentive—for Workmen	185	42	227
Bonus—for Foremen	136	19	155
Bonus—for Workmen	87	13	100

TABLE XXX—Gray Iron Foundry Apprentices Based on Reports from 443 Foundries

Apprentices	Jobbing Foundries		Captive Foundries		Total	
	No. of Foundries	No. of Apprentices	No. of Foundries	No. of Apprentices	No. of Foundries	No. of Apprentices
In Training	377	2,395	66	388	443	2,783
Additional Number Needed	182	1,001	29	223	211	1,224

TABLE XXXI—Ratio of Apprentices to Journeymen As Specified in 166 Labor Agreements

Ratio	Jobbing Foundries	Captive Foundries	Total
1 to 8	69	7	76
1 to 5	35	6	41
1 to 10	7	4	11
1 to 8 plus 1	8	0	8
1 to 6	6	0	6
1 to 7	5	1	6
1 to 5 plus 1	5	0	5
1 to 4	5	0	5
2 to 5	2	0	2
1 to 20	1	1	2
1 to 3	1	0	1
2 to 4	1	0	1
4 to 10	1	0	1
4 to 8	1	0	1
Total	147	19	166

TABLE XXXII—1946 Record of Lost Time Injuries in 373 Gray Iron Foundries

Type of Injury	Foundries Jobbing Foundries		Captive Foundries		Total	
	No. of Foundries	No. of Accidents	No. of Foundries	No. of Accidents	No. of Foundries	No. of Accidents
Resulting in Death	13	13	2	2	15	15
Permanent Impairment	65	110	11	24	76	134
Temporary Disability	277	5,944	37	959	314	6,903
No Accidents	47	0	10	0	57	0
Total—No Duplication	326	6,067	47	985	373	7,052
Manhours of Exposure		93,072,505		26,415,367		119,487,872
Accident Frequency Rate		65.2		37.3		59.0

TABLE XXXIII—1946 Record of Lost Time Injuries in 101 Gray Iron Foundries Not Reporting Manhours Worked

Type of Injury	Jobbing Foundries		Captive Foundries		Total	
	No. of Foundries	No. of Accidents	No. of Foundries	No. of Accidents	No. of Foundries	No. of Accidents
Resulting in Death	3	6	0	0	3	6
Permanent Impairment	12	20	3	3	15	23
Temporary Disability	78	1,174	19	230	97	1,404
Totals—No Duplication	82	1,200	19	233	101	1,433

TABLE XXXIV—Cost of Workmen's Compensation Insurance for 1946—384 Gray Iron Foundries

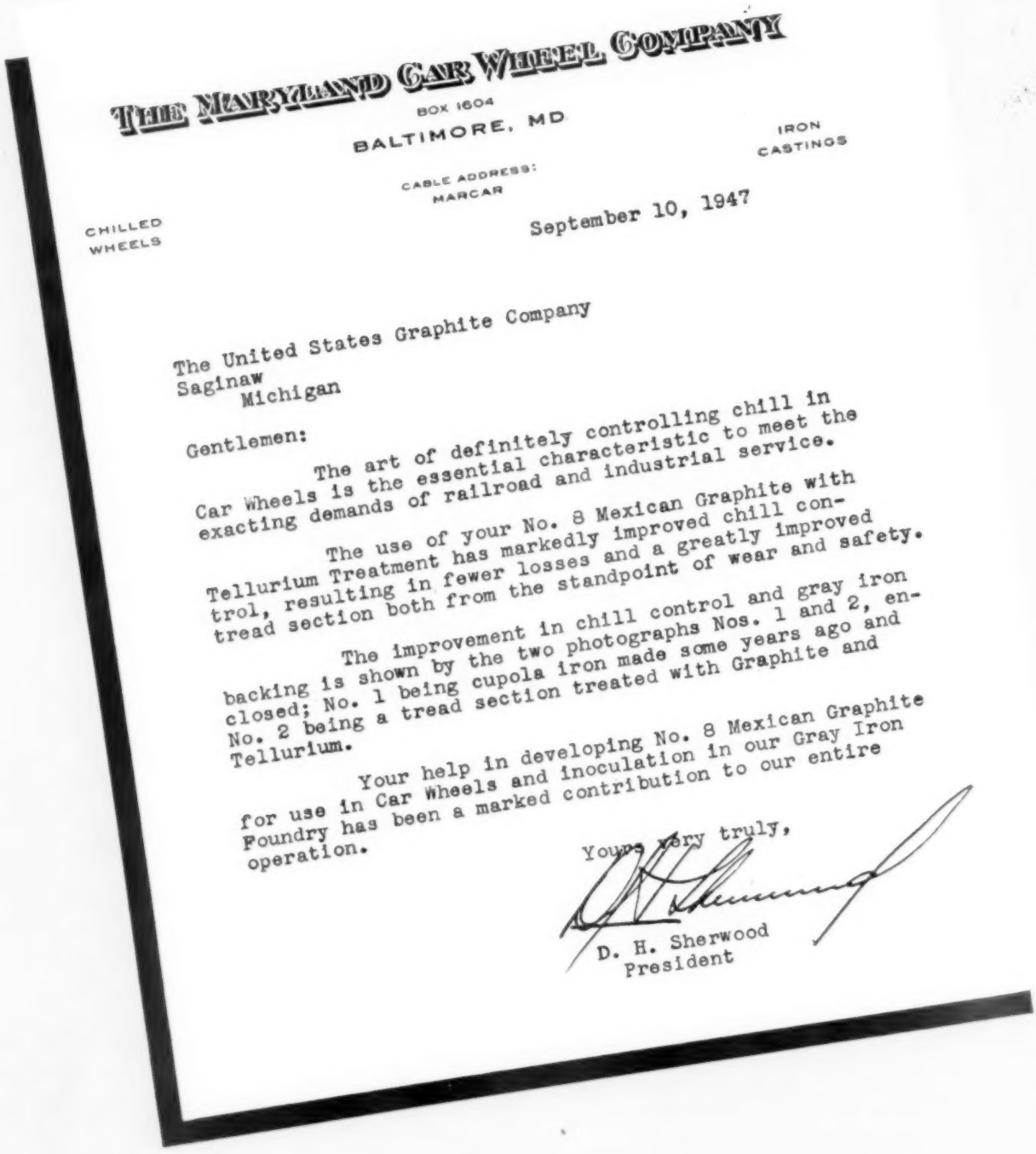
	Jobbing Foundries Number	Amount	Captive Foundries Number	Amount	Total Number	Amount
Total Cost	349	$1,651,927	35	$186,511	384	$1,838,438
Avg. Cost per Fdy.		$ 4,733		$ 5,329		$ 4,788

TABLE XXXV—Estimated 1946 Cost of Workmen's Compensation Insurance Per Manhour Worked

Item	Jobbing Foundries	Captive Foundries	Total
Avg. Cost of W.C.I. per Fdry.	$ 4,733	$ 5,329	$ 4,788
Avg. M.H. Exposure per Fdry.	285,499	562,029	323,430
W.C.I. Cost per M.H. Worked	$ 0.17	$ 0.10	$ 0.148

EXACT CHILL CONTROL COSTS LESS WITH

WRITES MARYLAND CAR WHEEL COMPANY



THE MARYLAND CAR WHEEL COMPANY

BOX 1604
BALTIMORE, MD

CABLE ADDRESS:
MARCAR

IRON CASTINGS

CHILLED WHEELS

September 10, 1947

The United States Graphite Company
Saginaw
Michigan

Gentlemen:

The art of definitely controlling chill in Car Wheels is the essential characteristic to meet the exacting demands of railroad and industrial service.

The use of your No. 8 Mexican Graphite with Tellurium Treatment has markedly improved chill control, resulting in fewer losses and a greatly improved tread section both from the standpoint of wear and safety.

The improvement in chill control and gray iron backing is shown by the two photographs Nos. 1 and 2, enclosed; No. 1 being cupola iron made some years ago and No. 2 being a tread section treated with Graphite and Tellurium.

Your help in developing No. 8 Mexican Graphite for use in Car Wheels and inoculation in our Gray Iron Foundry has been a marked contribution to our entire operation.

Yours very truly,

D. H. Sherwood
President

THE UNITED STATES GRAPHITE

NO. 8 MEXICAN GRAPHITE

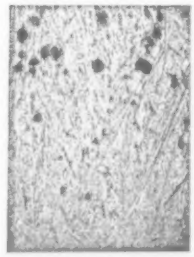
Another tough casting problem solved with No. 8 MEXICAN GRAPHITE!

The letter and photomicrographs from The Maryland Car Wheel Company tell the value of No. 8 Mexican Graphite for chill control in car wheel castings and for general inoculation of their grey iron castings.

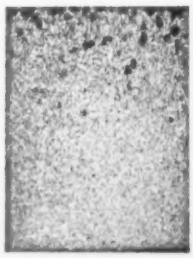
Chill control must be exact in car wheels—too low a chill results in lack of wear resistance—too high a chill threatens the safety of the wheel under service impact conditions. Yet the No. 8 Mexican Graphite used to maintain this exact chill depth *costs less than 1c per 750 lb. wheel casting!*

No. 8 Mexican Graphite has solved many other costly casting problems because it is a very powerful graphitizer and chill reducer which lowers hardness, making machining easier and cutting scrap losses. Thin sectioned castings such as soil pipe and fittings, sanitary ware, hardware, radiators, burner plates, pump impellers, agricultural automotive and machine castings have benefited from No. 8 Mexican Graphite. Treatment is simple—just toss one ounce No. 8 per 100 lbs. of iron into the ladle before filling or make a trickle addition at the spout, for hearth or bull ladle.

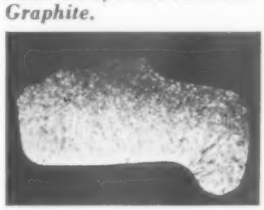
Give your customers machinable castings by using No. 8 Mexican Graphite—*write for our bulletin giving complete data.*

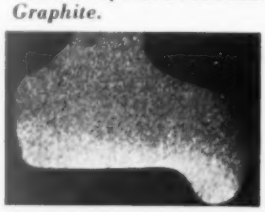


Photomicrograph and section of car wheel without addition of No. 8 Mexican Graphite.



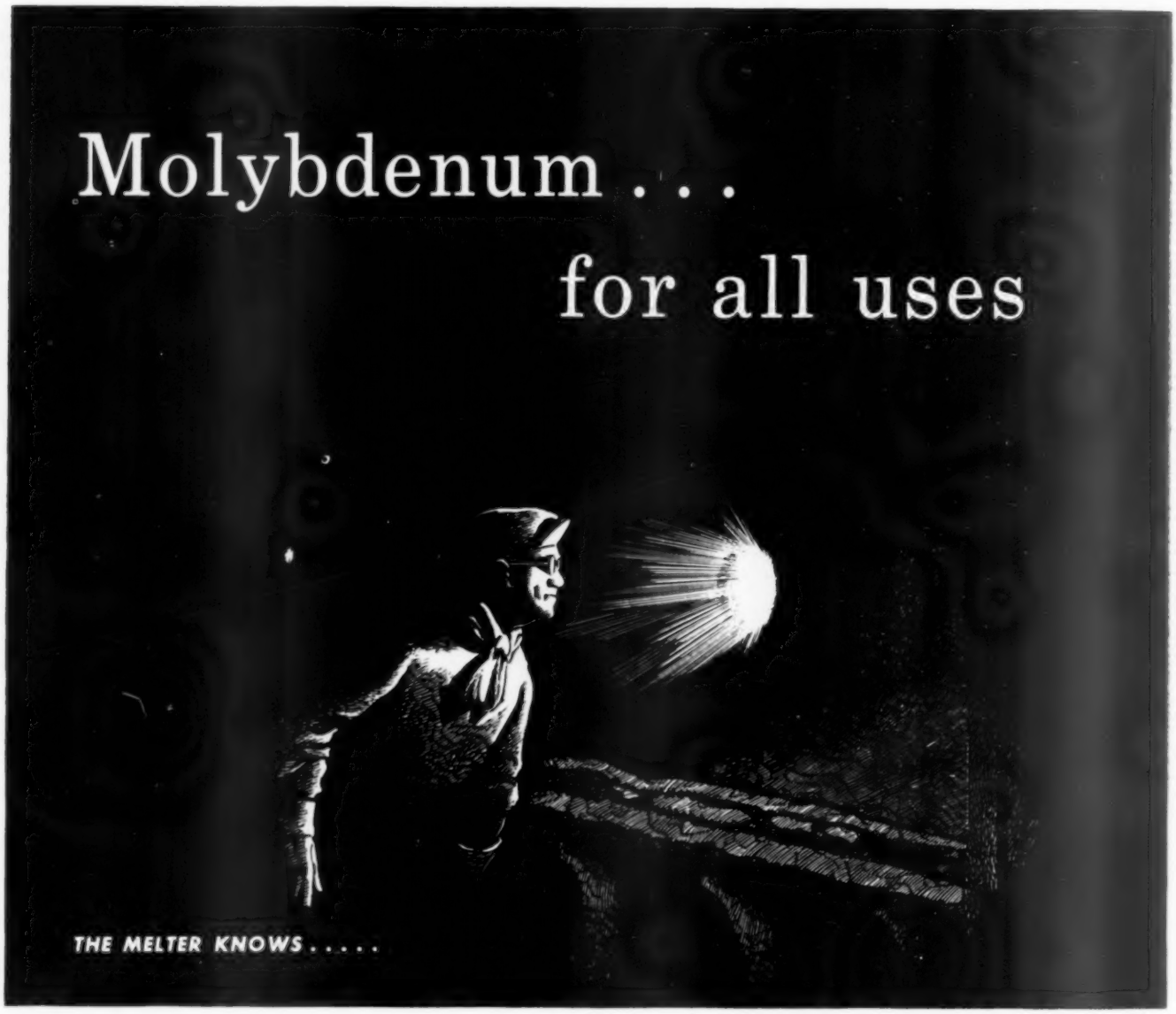
Photomicrograph and section of car wheel with addition of No. 8 Mexican Graphite.



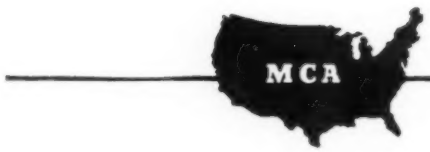


COMPANY · SAGINAW, MICHIGAN

Molybdenum . . .
for all uses



THE experienced melter knows he can depend on Molybdenum additions for uniform effects as calculated. He knows the customer can depend on the higher physical properties that Molybdenum adds. His comfortable assurance in the use of so trustworthy an agent is good to have. As a supplier of Molybdenum, Tungsten, and Boron, the Molybdenum Corporation is glad to be consulted at any time.



AMERICAN Production, American Distribution, American Control, Completely Integrated.

Offices: Pittsburgh, New York, Chicago, Cleveland, Detroit, Los Angeles, San Francisco, Seattle.

Sales Representatives: Edgar L. Fink, Detroit; Brumley-Donaldson Co., Los Angeles, San Francisco, Seattle.

Subsidiaries: Cleveland-Tungsten, Inc., Cleveland, O.; General Tungsten Manufacturing Co., Inc., Union City, N. J.

Works: Washington, Pa.; York, Pa.

Mines: Questa, New Mexico; Urad, Colorado.

MOLYBDENUM CORPORATION OF AMERICA
GRANT BUILDING PITTSBURGH, PA.

MCA

(*Continued from page* 141)

(p) Continuing the development of cast iron crankshafts for diesel engines.

(q) Collaborating with customers' engineers in developing new type furnaces, machines, etc.

The engineering approach to sales promotion exemplified by the procedures above listed is excellent. But only 20 foundries reported using one or more of these devices for building new business.

Product Specifications — 274 jobbing foundries and 52 captive foundries reported that they produce castings to one or more standard specifications. Such foundries represented about 52 per cent of the foundries which participated in the survey.

Nearly half (48 per cent) of all specifications used are those sponsored by the American Society for Testing Materials. Other specifications to which an appreciable number of foundries reported adhering, are those promulgated by ASME, SAE, and the U. S. government. Table XIV shows the number of foundries which reported using specifications developed by various sponsoring organizations. The percentage of gray iron foundries which produce castings to standard specifications is lower than in many metalworking industries.

High Test Irons—There is a noticeable postwar trend toward the greater production of special high test irons. Table XV gives facts regarding this development as disclosed by the survey. The number of foundries which expressed their views regarding the trend was greater than the number of foundries regularly producing special high test irons. About 40 per cent of all of the foundries which participated in the survey are regularly producing special high test irons.

Raw Materials — 427 gray iron foundries reported that pig iron and scrap constitute 22.7 per cent of their total manufacturing cost. Probably never in the history of the industry have these elements of cost represented so large a percentage of the cost of making gray iron castings. If the cost of labor be taken as 55 per cent of total manufacturing cost, it is seen that about 78 per cent of the cost of making gray iron castings consists of labor and direct materials.

Five hundred gray iron foundries reported consumption of 1,452,703 gross tons of pig iron of all grades, 1,414,515 gross tons of iron and steel scrap of all grades, (see Table XVI) and 700,459 net tons of foundry coke (see Table XVII). Pig iron constituted a fraction over half of the metallics charged in furnaces and cupolas. On a weight basis (after converting gross to net tons, in the case of metallics) the ratio of coke consumption to metallics charged was 1 to 4.7. Comparing this figure with normal ratios of from 1 to 7, to as little as 1 to 9, it is seen that foundries have had to use considerably more coke to obtain satisfactory melting temperatures—a fact which reflects the poorer quality of coke being received today.

In addition to the grades of cast scrap listed in Table XVI, the following grades were reported purchased: Agricultural, bar stock, briquets, borings and heavy breakable machinery—all in limited quantities.

It is of interest that malleable pig iron and the northern grade of foundry pig iron together constitute about two-thirds of all pig iron used by reporting foundries. No. 1 cupola cast scrap represents about three-fourths of all cast scrap used by reporting foundries. Miscellaneous structural and scrap rails represent about two-thirds of all steel scrap used by reporting foundries. Beehive coke represents only 8 per cent of the coke used by reporting foundries, the balance being the by-product type.

Melting Equipment — Foundries which returned the survey questionnaires reported operating 968 cupolas with a combined hourly capacity of 8095 tons. Assuming 1000 hours of operation per year, this equipment would be capable of delivering annually 8,095,000 tons of molten iron. This estimate is based on about 4 hours of cupola operation per day. Table XIX shows the number of different size cupolas in use. The accompanying chart presents much the same information in graphic form. It is apparent from these data that 5 ton and 10 ton per hour units are the most numerous. The average hourly output of all cupolas covered by the survey was 8.4 tons.

Foundries which returned survey questionnaires reported operating 18 electric furnaces capable of handling a combined charge of 100,365 pounds, or an average of a little over one ton (2,091 pounds) per unit. (See Table XX). Inasmuch as electric furnaces are frequently used as holding furnaces to maintain or increase pouring temperatures, no effort was made to determine the total melting capacity represented by this equipment.

There were 13 air furnaces reported, ranging in size from 300 pounds per charge to 60,000 pounds per

(*Continued on page* 148)

Officers Elected by Aluminum Group

At the 13th annual meeting of the Aluminum Association, held in New York, Jan. 20-22, George N. Wright, sales manager, the John Harsch Bronze & Foundry Co., Cleveland, was re-elected chairman of the foundry division and appointed to the board of directors. E. G. Fahlman,

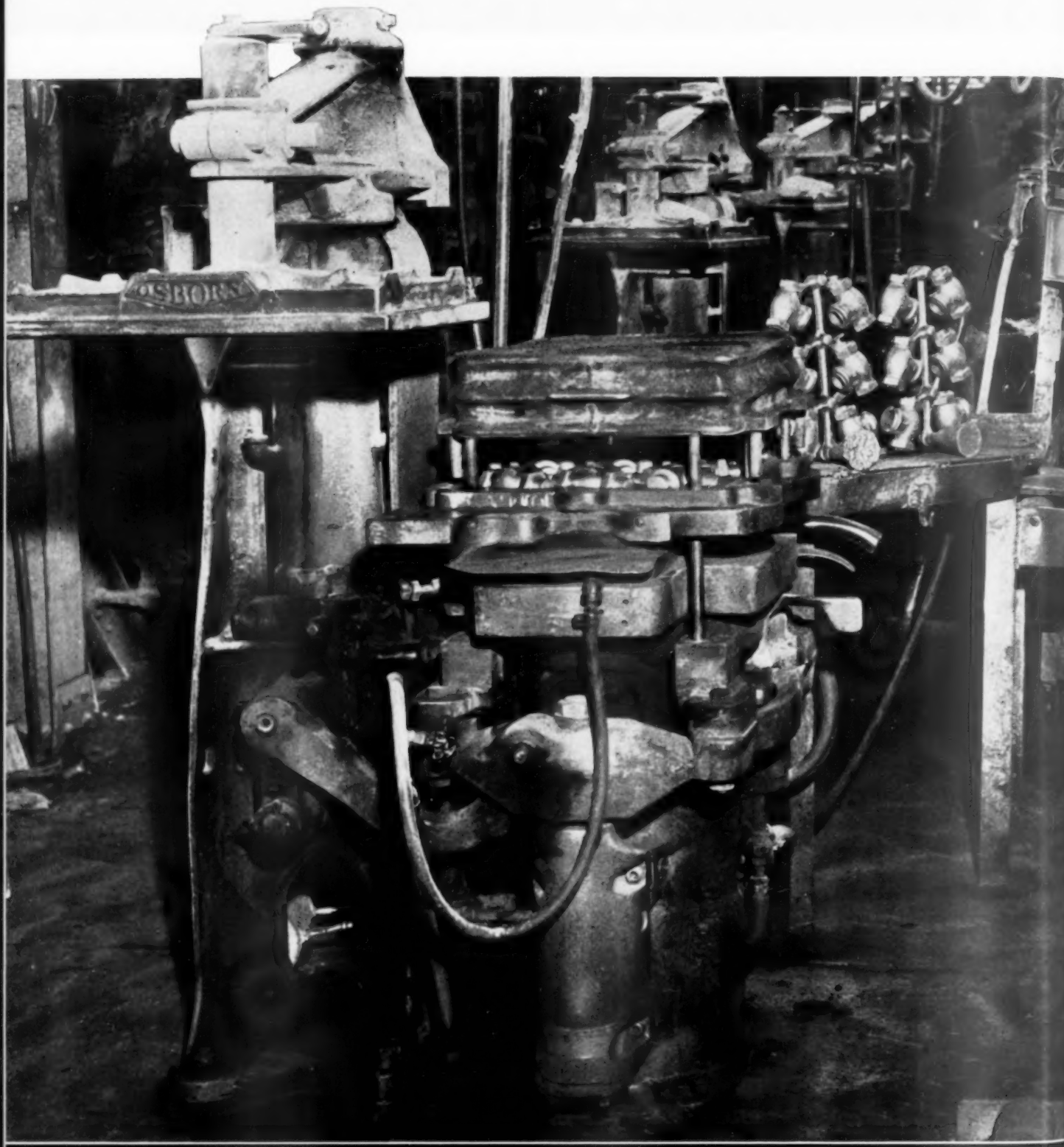
GEORGE N. WRIGHT

president, the Permold Co., Medina, O., was chosen vice chairman of that division. A. V. Davis, chairman of the board of directors, Aluminum Co. of America, was re-elected chairman of the board of directors of the association and R. G. Farrell, board chairman of the Fairmont Aluminum Co., Fairmont, W. Va., was re-elected president.

Also re-elected as vice presidents of the association were: H. B. Harvey, president the Harvey Metal Corp., Chicago; Harry J. Hater, president, Aluminum Industries Inc., Cincinnati; and R. S. Reynolds Jr., vice president and treasurer, the Reynolds Metals Co., Richmond, Va. Donald M. White, secretary of the association since 1945, was reappointed to that position.

The following were elected directors-at-large to the board; G. A. Ginsberg, United Smelting & Aluminum Co. Inc., New Haven, Conn.: H. L. Smith Jr., Aluminum Co. of America, Pittsburgh; I. P. Macauley, Reynolds Metals Co., New York office; R. J. Roshirt, Bohn Aluminum & Brass Corp., Detroit; D. A. Rhoades, the Permanente Metals Corp., Oakland, Calif.; A. P. Cochran, Cochran Foil Co. Inc., Louisville; Frank B. Cuff, New York office of Aluminum Co. of America; William Singer, Apex Smelting Co., Chicago; and W. G. Reynolds, Louisville offices of Reynolds Metals Co.

INCREASE PRODUCTION OF SHALLOW



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Simultaneous vibrating squeeze gives extreme accuracy and quality finish on reasonably shallow work, such as small valves and fittings. This patented Osborn feature increases the flow-ability of the sand during the squeezing operation, resulting in harder and more accurate moulds than are obtained from other machines of comparable size.

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MOULDING MACHINES

CORE BLOWING MACHINES

MEMBER

MANUFACTURER'S ASSOCIATION, INC. FOUNDRY EQUIPMENT

(*Continued from page* 145)

charge. (See Table XXI).

In addition to the melting equipment reported above, one foundry stated it was using four oil-fired furnaces, each having a capacity of 200 pounds per charge. We have seen a gas-fired, rocking type gray iron melting furnace in process of being installed but have had no report on operating results.

Research—Table XXII gives information disclosed by the survey regarding various types of research conducted by reporting foundries. These figures are significant in a number of respects. They show that about one foundry in 7 is carrying on research to improve its product from a metallurgical standpoint; that about one foundry out of 15 is conducting research for the improvement of production methods and processes; and that about one foundry out of 25 is doing research for the purpose of broadening markets or improving sales methods.

It is also significant that of the nearly $750,000 spent by about a hundred foundries each year for various types of research (about $7000 per foundry), less than 10 per cent is expended in promoting the merchandising of the product. Captive foundries which have research programs spent proportionately more per foundry than jobbing foundries engaged in research.

Mechanization—The installation of continuous pouring units is becoming a more and more common occurrence in the industry. Many of these units have been installed and placed in operation since the war. That the labor saving, cost reducing value of these units is not confined to production work only is indicated by the fact that of the 83 companies reporting the use of continuous pouring, 60 of them are jobbing foundries.

We have seen as many as six units in operation in a single plant. It is to be hoped that one or more foundries will develop actual figures on the cost of operating continuous units as compared with traditional methods, making such information available to all members of the society.

Increased mechanization is the order of the day throughout a large portion of the industry. Over five times as large a volume of modernization and mechanization is in process of installation today compared with the prewar period. This significant trend is traceable primarily to the mounting cost of manual labor. Increased output and uniformity of product are other basic reasons for the trend.

Number of Full-Time Employees—Table XVIII shows the number of full-time employees reported by foundries which participated in the survey. Applying multiplication factors to obtain approximate figures for the entire industry, it is found that there may be as many as 200,000 employees on the payrolls of gray iron foundries in the United States. If this estimate is substantially correct, then the figures on number of employees in the gray iron foundry industry as published monthly by the U. S. Bureau of Labor Statistics is far too low—less than half the true total. This is believed to be the case, based on other available tests and criteria.

The Bureau of Labor Statistics, Department of Labor, publishes monthly reports covering average hourly earnings, average weekly earnings, and hours worked per week by gray iron foundries. These figures have been checked with other statistical series (notably those compiled by the National Industrial Conference Board) and are considered reliable.

Table XXIII shows the daily work schedules of reporting foundries in terms of shifts operated. It is clear that (1) the great preponderance of the industry is operating on a single shift per day basis and (2) that a greater percentage of captive foundries are operating on a multiple shift basis than in the case of jobbing foundries. Table XXIV shows the length of shifts worked and the number of foundries working such shifts. It is clear that the great preponderance of the industry operates on an eight-hour shift basis, although an appreciable number are operating nine-hour shifts.

Table XXV shows the number of days worked per week by reporting foundries. It is interesting to note here (1) the comparative unpopularity of the half-day Saturday, (2) the predominant adherence to the five-day week, and (3) the appreciable number of foundries (19 per cent of the total) which are working six days a week.

Labor Agreements — 320 jobbing foundries and 72 captive foundries reported that they had written labor agreements with one or more unions. Close to two-thirds of all foundries reporting are operating under formal labor contracts. These figures show that written agreements with unions affiliated with the AFL are twice as numerous in this industry as are those with unions affiliated with the CIO Organizations.

Table XXVII discloses certain important facts about existing labor

(*Concluded on page* 150)

CASTING DISPLAY: Superior Foundry Inc., Cleveland, recently displayed some of its products in the lobby of a downtown bank in that city. As indicated by the above views of the exhibit, photographs of typical foundry scenes as well as a variety of the company's cast products were shown. Castings in the center of the lower view were displayed on a revolving turntable

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There is no easier way to handle metal than via Cleveland Tramrail. No hand carrying. No spillage. No hard work. The ball-bearing wheeled carriers ride freely on the smooth overhead track.

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CLEVELAND TRAMRAIL
OVERHEAD MATERIALS HANDLING EQUIPMENT

(*Concluded from page* 148)

agreements, and the number of foundries which reported operating open shops. The closed shop has been legally outlawed by the terms of the Labor-Management Relations Act of (June) 1947.

The months in which labor agreements reported by foundries which participated in the survey expire are given in Table XXVIII. It will be seen that the maturity dates are scattered, the two major cycles ending with January and July.

Whether the periodicity of present agreements will be radically changed by the operation of the Taft-Hartley Act is problematical. There is likewise some question as to whether the unions will continue to press for formal written agreements or whether they will present sets of terms of employment on behalf of their members and ask for no signed agreements for conformity to the terms of which they could now be legally held responsible.

The conservative point of view would be to assume that there would be no substantial change in the labor agreement situation in this industry.

Worker Efficiency—Following is a list of things which have been done by foundries to increase efficiency of employees, arranged according to the number of times each was mentioned, the one most frequently mentioned heading the list. There is some overlap but no duplication: Installed new equipment, mechanized production facilities, established incentive pay system, improved working conditions, set up piece work rates, improved supervision, modernized old equipment, improved production methods, miscellaneous improvements.

The above list could be reduced to three main elements: (1) Improved production equipment and methods. (2) Incentive pay. (3) Improved working conditions.

Job Evaluation—104 jobbing foundries and 30 captive foundries stated that they have job evaluation systems in operation. While the number of foundries indicating that they have job evaluation systems in operation in their plants (134) is only a little over 21 per cent of the total number reporting on the survey, it does indicate considerable interest in this important management tool.

One hundred sixty-two jobbing foundries and 48 captive foundries reported the use of time-study methods in setting piece-work rates. It is natural that more foundries should report using time study methods (210) than the number using job evaluation. Time study methods have been used in the foundry industry for several decades, while job evaluation has been in use little more than a decade. It is surprising that so few gray iron foundries employ time study technique which is practically a "must" in setting up incentive pay systems of any sort.

Table XXIX, showing the prevalence and application of incentive and bonus plans for foremen and workmen, indicates that incentive plans are favored for rewarding workmen for increased productivity, but that bonus plans are favored for foremen.

Table XX, giving the number of apprentices in training at reporting foundries and the number of additional apprentices needed, shows that 210 jobbing foundries and 38 captive foundries reported number of apprentices now in training sufficient to meet their current needs, while 191 jobbing foundries and 29 captive foundries stated they need more apprentices than they now have in training.

Need More Apprentices

The number of apprentices in training at reporting foundries average six per foundry. Based on the figures in the table, it would appear that there is need for about 44 per cent more apprentices than are now in training.

Table XXXI shows restrictions as to ratio of apprentices to journeymen imposed by labor unions. Restrictions on ratio of apprentices to journeymen vary widely; all the way from 1 apprentice for each 20 journeymen to 2 apprentices for each 4 journeymen. These restrictions undoubtedly have an important bearing on the shortage of apprentices reported by about half of the foundries participating in the survey.

Accident Record — Table XXXII shows the 1946 accident record of the foundries which participated in the survey and which reported total man-hours worked. These figures indicate a much better accident record in captive foundries than in jobbing shops, but the frequency rate in both types of foundries is much too high for complacency.

The U. S. Bureau of Labor Statistics shows a 1946 annual frequency rate for iron foundries of 45.5, which is greater than the rate shown for captive foundries in Table XXXII, but considerably under the rate shown for jobbing foundries.

Table XXXIII shows injuries reported by foundries which did not give their man-hours of exposure. The frequency rates set forth in Table XXXII are very high. The severity rates, which cannot be obtained by formula from the survey figures, would also be high. Here is an important problem for management to attack in a sustained effort to improve the record. To neglect this problem costs money—a great deal of it.

Table XXXIV shows amounts paid by the foundries surveyed for workmen's compensation insurance. Based on the average man-hours of exposure per foundry and the annual cost of workmen's compensation insurance as shown in Table XXXIV, it appears that the cost for this industry is about 1½ cents for every man-hour worked in 1946. Table XXXV presents these facts. The cost of accidents per man-hour does not cover the hidden cost incurred through loss of production, and other concommitant costs.

Two excellent surveys of injury and accident causes in the foundry industry were made by the Industrial Hazards Division of the Bureau of Labor Statistics, U. S. Department of Labor. One covered the year 1943 (their Bulletin No. 805); the other covered the year 1945 (their Bulletin No. 889).

For example, it has been shown that foot, back, finger, leg, hand, toe and eye injuries (in that order) are the ones most to be guarded against in the molding department. In the cleaning and finishing department one should provide safety measures to prevent eye, finger, foot, leg, toe, back and hand injuries (in that order).

Again, it was found that the nature of injuries in gray iron foundries, arranged in descending order according to frequency of occurrence are (1) strains, sprains and bruises; (2) cuts and lacerations; (3) burns and scalds, and (4) fractures. In general, injuries—according to frequency of occurrence—involve the feet, fingers or thumbs, back, eyes, legs, toes and hands, followed by other parts of the body.

Credits, Collections—68 foundries reported that they subscribe to some sort of collection service for use in collecting over-due accounts. Two hundred fourteen foundries reported that they subscribe to some sort of credit service for use in obtaining information on the credit standing and financial responsibility of new and present customers. One hundred forty-three foundries reported average losses on account of bad debts of less than 1 per cent (.93 of 1 per cent) of sales. The percentage of bad debt losses is low in terms of total sales, and as compared with other manufacturing industries.

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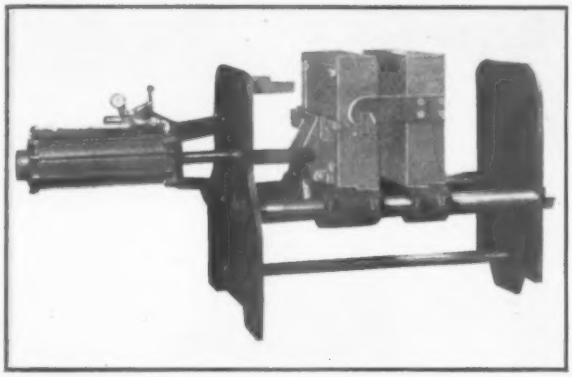
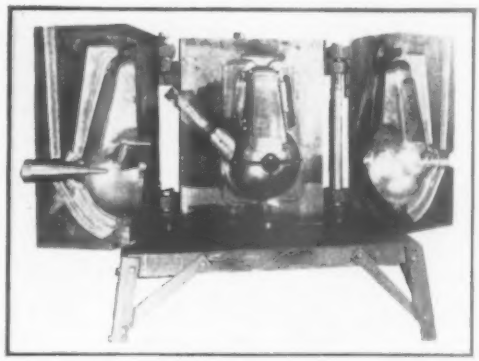


For suitable production castings, pneumatic permanent mold equipment gives you even greater economy and also speeds production. The main advantage of this kind of mold equipment is that the interchangeable custom built mold blocks can be quickly and easily bolted to this air operated table. This interchangeable feature greatly reduces future mold costs. The table itself is durable and simple in design and can be used continuously.

This method of making aluminum castings is rapidly becoming more popular because it is based on three sound economic reasons. Aluminum castings produced in permanent molds are cleaner and better looking; they have a closer dimensional accuracy; they can be produced more economically.



For certain types of castings depending on the production, size, and weight, the manually operated is most economical.

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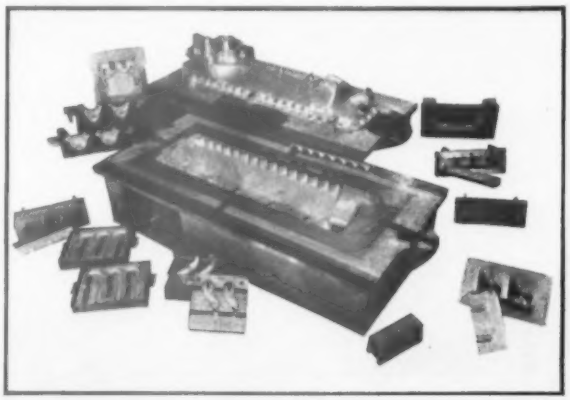
We are also equipped to make all types of wood and metal patterns in accordance with the specifications of your foundry. Precision patterns and models are a specialty.

Your molds and pattern equipment, if properly constructed for the purpose they are to be used, can save you up to 25% on casting cost. On high production items this can amount to even greater savings.

Investigate now for greater savings later.
Send us your blueprints or sample castings for quotation.



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Activities Foundry GROUPS

Tennessee

ENTHUSIASTIC approval of a proposal to form a new AFA chapter in Tennessee was expressed at an organizational meeting of district foundrymen at the Patten Hotel, Chattanooga, Feb. 10. More than 80 AFA member signatures were obtained to the petition subsequently submitted to the national board of directors for the latter's approval of the new chapter's formation.

Guiding force in the plans which have led to the chapter organization has been an 11-member steering committee created last December and headed by Chairman G. Frank Anderson, vice president and general manager, Chattanooga Implement & Mfg. Co. Other members of the group include: Vice chairman, C. B. Saunders, Southern Ferro Alloys Co.; secretary-treasurer, A. D. Willis, United States Pipe & Foundry Co.; Porter Warner Jr., Porter Warner Industries; O. T. Walker, Columbian Iron Works; Fred McGee and Herbert Dent, manufacturers' agents; W. C. Cate, Crane Co.; Karl Landgrebe Jr., the Wheland Co.; P. O. Arnold, United States Pipe & Foundry Co.; W. D. Greiser, Ross-Meehan Foundries Inc. It was voted that officers of this committee serve the new chapter in the same capacities until the next regular election of officers.

Mr. Anderson presided at the meeting, which had a total attendance of approximately 135. Heading the out-of-town guests were Max Kuniansky, Lynchburg Foundry Co., national AFA president, and William W. Maloney, national secretary-treasurer. Others included L. N. Shannon, Stockham Pipe Fittings Co., past national president; Tom Benners and Ned Jones, immediate past chairman and current chairman, respectively, of Birmingham District Chapter; Horace A. Deane, a national director, Ross Jones and D. H. L. Bealer, all of American Brake Shoe Co.; and Victor M. Rowell, Velsicol Corp., Chicago Chapter secretary.

In addressing the group Mr. Kuniansky cited the important role of the AFA in technical developments of the foundry industry, and discussed the activities of the society's various divisions. He pointed out that effective functioning of AFA depends to a large extent on a strong chapter organization, and emphasized that the keystone of each chapter's strength lies in its technical program. Mr. Maloney went into additional details regarding activities of the national association and outlined the procedure for establishment of the proposed Tennessee Chapter.

Following approval of the chapter organization the remainder of the meeting was devoted to a technical program, with Gosta Vennerholm, Ford Motor Co., Dearborn, Mich., the speaker. Mr. Vennerholm, in a discussion of his company's current $12 million foundry modernization program, explained that it is the outgrowth of a careful study to determine what operations can be handled by machine rather than by hand—with a consequent improvement in both production and working conditions. Three-fourths completed, the program has permitted an increase of more than 25 per cent in daily production of cast motor blocks with the same number of men as formerly. The speaker illustrated his remarks by the showing of a motion picture depicting the making of cylinder block castings.—*William G. Gude.*

Detroit

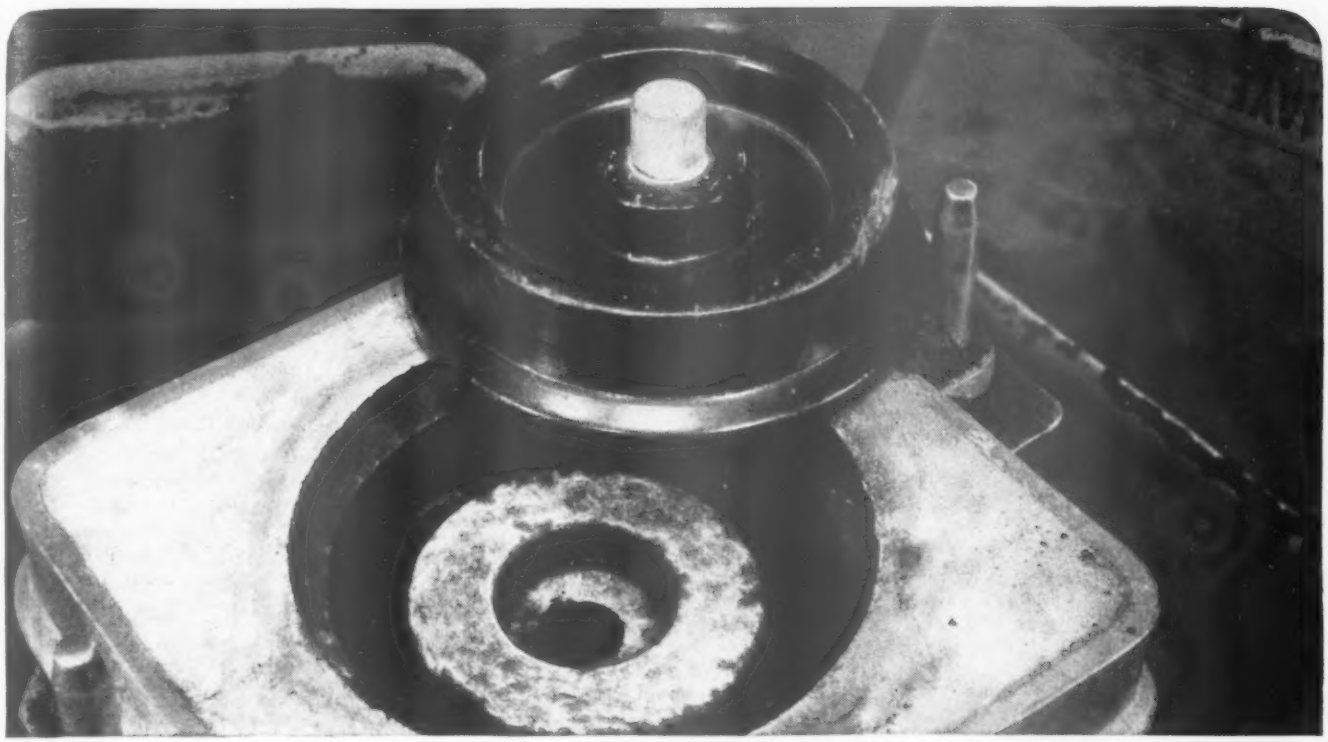
REGULAR monthly meeting of Detroit Chapter of the AFA was held Feb. 19 at Horace H. Rackham Educational Memorial Building with 160 attending the dinner and group sessions.

A coffee talk entitled "I'm Telling You," was given by Walter W. Fuller, editorial department, *Detroit News.* Following his talk the meeting was divided into three groups for technical discussions.

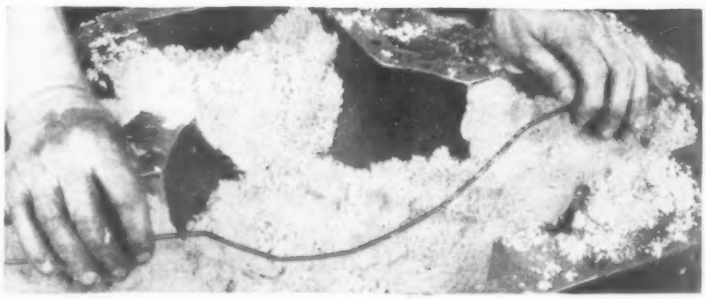
V. A. Crosby, metallurgical engineer, Climax Molybdenum Co., Detroit, addressed the gray iron section on "Selection of Gray Iron for Automotive Use." He discussed existing specifications in the light of actual results which serve to justify or condemn present requirements and to indicate in which direction improvements may be effected. J. E. Coon, metallurgist, Packard Motor

(*Continued on page* 154)

EASTERN NEW YORK: Officers of the newly formed Eastern New York Chapter of the AFA at Albany, N.Y., are shown here. Front row, left to right are: Hans Hinrick, Alexander Andrews, Charles E. Killmer, John Wettergreen, and Joseph Wheeler. Back row, left to right, are: Paul Wilson, Benjamin Sweil, Kenneth Echard, Reginald de Varrenes, Leonard Wilson and Chester L. Richards. At left is Donald J. Reese, International Nickel Co., a recent guest speaker



gives sharp edges



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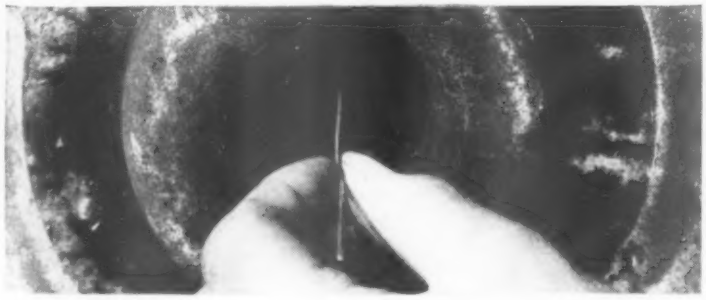

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● Sharp edges, soft interiors, permeability and easy drying are just a few of the advantages you get when you use KORDEK.

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PATTERNS and patternmaking were discussed at the Feb. 2 meeting of Central Illinois Chapter of the AFA by V. J. Sedlon, Master Pattern Co., Cleveland, shown above at left in conversation with J. E. Kolb, Caterpillar Tractor Co., Peoria, Ill., who was technical chairman at the meeting

(*Continued from page* 152)

Co., was discussion leader.

At the session on malleable iron, Elmer C. Zirzow, of the National Malleable & Steel Castings Co., Cleveland, spoke on "Malleable Foundry Practice." He highlighted recent developments as they affect malleable practice, including the use of chemically coated sands. H. Gravlin, Ford Motor Co., was discussion leader.

H. L. Smith, metallurgical engineer, Federated Metals Division, American Smelting & Refining Co., Pittsburgh, addressed the brass and bronze group on "Brass and Bronze Melting." He explained how melting plays a considerable part in deciding the external appearance of castings, their soundness and particularly their mechanical quality. He stated that success in the production of bronze castings depends upon the metallurgical control of composition, melting conditions and casting temperatures. V. C. Reid, City Pattern Foundry & Machine Co., was discussion leader. —*Charles J. Rittinger, American Car & Foundry Co.*

CENTRAL INDIANA Chapter of the AFA celebrated National Officers' Night Feb. 2 at Indianapolis. H. L. Smith, chief metallurgist, Federated Metals Division, American Smelting & Refining Co., is shown at upper left addressing the nonferrous section of the meeting. At upper right is Frederick Wurscher, metallurgist, Chicago Railway Equipment Co., who addressed the ferrous section. Lower photo is a view of the speakers' table. From left to right are: Frederick Wurscher, Fred Kurtz, Rev. F. W. Hartsock, William Wallis, William Ziegelmueller, William Maloney and George Clark. Photos by staff photographer, International Harvester Co., Indianapolis

Central Indiana

APPROXIMATELY 200 Indiana foundrymen attended the National Officers' Night meeting of Central Indiana Chapter of the AFA at the Athenaeum, Indianapolis, Feb. 2. Guests at the dinner meeting were William Maloney, national AFA secretary-treasurer; William B. Wallis, national vice president, and Frank G. Steinebach, editor, THE FOUNDRY.

Following the dinner, Mr. Wallis described economic conditions in England and western Europe and recounted many of his experiences during a recent tour of these countries. Mr. Maloney gave a resume of national AFA activities.

The meeting then was divided into ferrous and nonferrous sections. Frederick J. Wurscher, metallurgical engineer, Chicago Railway Equipment Co., addressed the ferrous section on "Duplexing and Triplexing Melting Operations."

The nonferrous section heard a talk by H. L. Smith, chief metallurgist, Federated Metals Division of American Smelting & Refining Co., on "Nonferrous Melting Atmospheres."—*William K. Mitchell.*

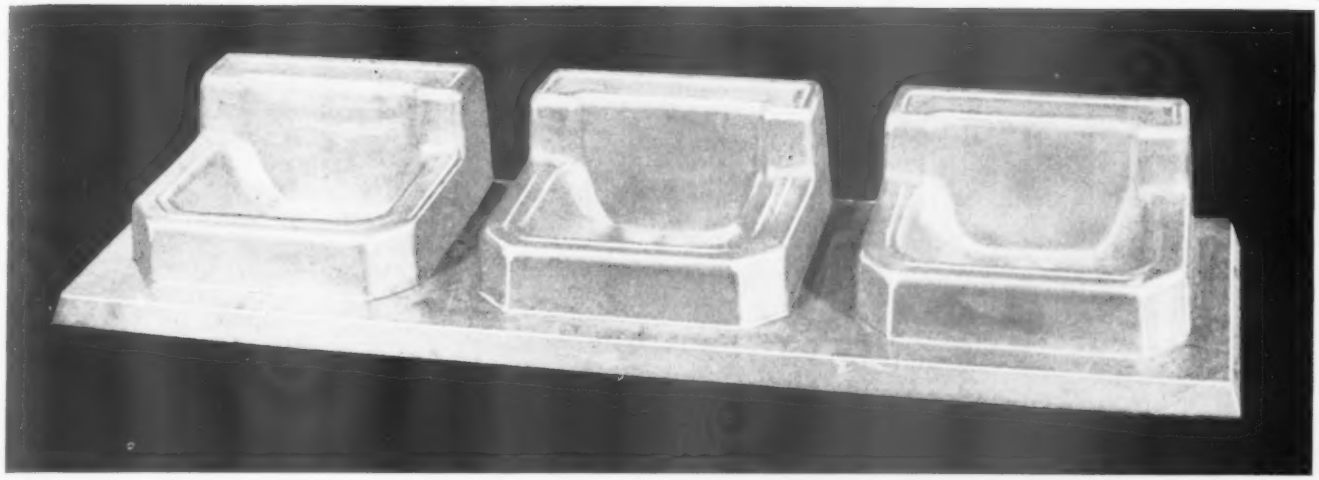
Wisconsin

SIXTY-FOUR foundries in Milwaukee and nearby cities, all members of Wisconsin Chapter of the AFA, are sponsoring an advertising campaign to acquaint the public with the industry's importance and to encourage recruitment of young men for foundry jobs.

George Tisdale, Zenith Foundry Co., West Allis, Wis., is head of the publicity committee for the campaign, which includes five newspaper advertisements and distribution of a booklet, "Your Future in the Foundry."

Windup of the campaign will be the Wisconsin Chapter's annual Old Timers' Night May 14 at Schroeder Hotel, Milwaukee. All men who have

(*Continued on page* 156)



For the smoothest, fastest and most accurate aluminum pattern equipment

PRECISION PATTERNS

WITHOUT SIZE LIMITATIONS

Increased profitable production at lower cost with less scrap is a positive and direct result obtained by using our pressure cast aluminum pattern equipment.

We shall be pleased to receive your request for quotations, delivery dates and layout forms.

See our other ad. on Page 14.

MATCH PLATES
MULTIPLE COREBOXES
COPE & DRAG-PLATES
LOWEST CLEANUP COST
PROMPT DELIVERY

Only one master pattern required. Allow 1/8" per ft. for our shrinkage

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AFFILIATED PLANT LOCATIONS:

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821 N. 21st St.	1502 W. 8th St.	220 Washington St.	207 S. Sheridan

(*Continued from page* 154)
been employed in the industry 50 or more years will be guests at the dinner, as will apprentices who will be awarded the annual prizes for best workmanship in the annual apprentice contest.—*John E. Hubel*

Chesapeake

INSTEAD of the usual technical meeting in December, a gala oyster party was held. Attendance, in the neighborhood of 350, broke all records for the chapter.

At the January meeting, Capt. H. A. Schade, director, Naval Research Laboratory, presented an interesting informal coffee talk about some of his experiences guiding the Naval Technical Mission in Europe. The meeting then broke up into three groups for round-table discussion.

Bonney Miller, Baldwin Locomotive Works, led a spirited session of cast iron foundrymen who discussed problems of cupola operation. Certain practices were recommended for increasing the carbon and reducing silicon pick-up during cupola melting.

Al Hesse of R. Lavin & Sons, conducted the nonferrous roundtable where it was emphasized that control of H_2, H_2O and CH_4 gases in metals may be had through creation of neutral, reducing and/or oxidizing furnace atmospheres.

At the steel roundtable discussion, Ed Crown, Naval Gun Factory, presided and descrited in detail the equipment and operation of the new 6 and 25-ton capacity electric arc furnaces recently installed at the gun factory.

Coffee speaker at the February meeting was a Mr. Wallace who emphasized that the apple growers in this area, whom he represents, have just as many problems as foundrymen.

As technical speaker of the meeting, Don Potter, Stewart-Warner Co., described the many intricate operations required to produce precision castings by the lost-wax and the plaster mold processes. The talk was well illustrated with slides and included many procedures developed at the Naval Research Laboratory where Mr. Potter formerly directed precision casting studies.—*Jack H Schaum, National Bureau of Standards.*

Northwestern Pennsylvania

FEBRUARY was a month of great activity for Northwestern Pennsylvania Chapter of the AFA. There were four meetings. On Feb. 5 the officers met with local school authorities to formulate a program to interest students and their parents in what the foundry industry means to them and the community.

On Feb. 19 at a meeting in Franklin, Pa., Ralph L. Lee, department of public relations, General Motors Corp., Detroit, talked on "Production Rhythm—Man to Man." He stressed the value of more understanding on the part of both management and labor in their common problems and added a campaign for more production must carry with it an incentive for more and better work on the part of the worker. Treating the workers with the respect due them

(*Continued on page* 158)

SOUTHERN CALIFORNIA Chapter of the AFA heard J. W. Cable, Induction Heating Corp., speak on the electronic baking of cores at the January meeting. Some views of the dinner meeting are shown here

HEAT - SMOKE

Employee morale, accident rates, production and finally profits are influenced by these elements.

The foundry engineers of Giffels & Vallet, Inc. will assist in controlling heat and smoke.

For existing or new foundries they will lend their twenty years of experience in designing layouts, equipment and mechanical systems to control these conditions. They will help to make the foundry a better place to work.

GIFFELS & VALLET, INC.

INDUSTRIAL ENGINEERING DIVISION

1000 MARQUETTE BUILDING, DETROIT

CONFERENCE COURSE in "Foremanship and Human Relations," which was sponsored jointly by Northeastern Ohio Chapter of the AFA and the Cleveland Trade School, recently was completed by this group of Cleveland foundry foremen and supervisors with a banquet at Hotel Carter, Cleveland

(*Continued from page* 156)

as real people will get the best results while the attitude of supervision, which Mr. Lee described as "dealing out manners on the basis of the replacement of our people," will often fail. Ninety-four attended this meeting at which Tom Beaulac, foundry superintendent, Chicago Pneumatic Tool Co., Franklin, presided.

In the Moose Club Blue Room, Erie, Pa., Feb. 23, Carl Joseph, technical director, Central Foundry Division, General Motors Corp., Saginaw, Mich., discussed malleable iron castings production. Mr. Joseph stated that with today's shortage of melting materials the most careful control is necessary to produce quality castings and maintain a low scrap loss. He stressed the point that there are too many deviations to standard practices in foundries and that troubles can not be attributed to any one cause if standard practices are not set up and followed.

He emphasized the need of training men for supervisory positions and followed his talk with a movie of old and new methods of the Saginaw Malleable Division of General Motors, explaining the operations as shown on the screen. Earl M. Strick, Erie Malleable Iron Co., Erie, Pa., led the discussion.

On Feb. 23 Mr. Strick addressed 400 students at Erie Technical High School on the foundry industry and the old and new methods of cleaning castings. He explained to the students what the foundry industry means to them in their every day lives and gave a number of reasons why they might make it their future career. The talk was followed by a showing of the Pangborn Corp. movie on modern cleaning methods.

This is one of the many meetings the chapter will hold in various schools throughout the community.—*Earl M. Strick, Erie Malleable Iron Co.*

TWIN CITY: Twin City Chapter of the AFA met at Minneapolis, Feb. 5, to hear a talk by Tom E. Barlow, Eastern Clay Products Inc., Jackson, O. View at bottom shows part of the speakers' table, and upper view shows part of the group who attended the meeting

Chicago

FOUNDRYMEN should subject their coreroom practices to critical examination, weeding out bad practices and standardizing good ones, in the interest of preventing waste. This was the moral in an interesting and colorful address which L. P. Robinson, director of core oil sales, Werner G. Smith Co., Cleveland, made before the Chicago Chapter of the AFA, Mar. 1.

The meeting, held in the quarters of the Chicago Bar Association, was exceedingly well attended. Chapter President Fred B. Skeates, foundry superintendent, Link-Belt Co., Chicago, presided over the general portion of the meeting, and Vice President Chester K. Faunt, works manager, Christensen & Olsen Foundry Co., Chicago, handled the technical portion of the program.

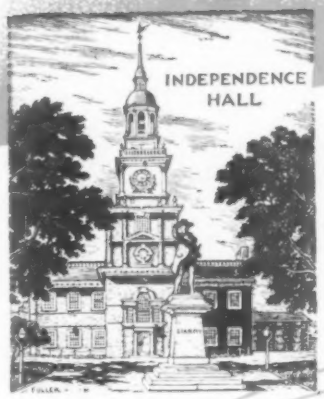
Mr. Robinson, speaking on the subject "Let's Stop Guessing in the Coreroom," asserted there is entirely too much waste in coremaking arising from excesses in use of materials and not having practices under rigid control. He traced operations from sand mixing to core molding and baking. A common fault is lack of adherence to standards.

The speaker emphasized the importance of controlling core baking, both as to temperature and time. He suggested that foundrymen should find out what are the best temperature and time and then stick to them. Another subject discussed at some length was moisture content. Best core strength, he stated, is obtained with minimum moisture.

Mr. Robinson's reputation as a story-teller suffered none in his Chicago appearance, for he concluded his formal remarks in appropriate fashion.

Chicago Chapter will conduct another general meeting on Apr. 5 with

(*Continued on page* 160)



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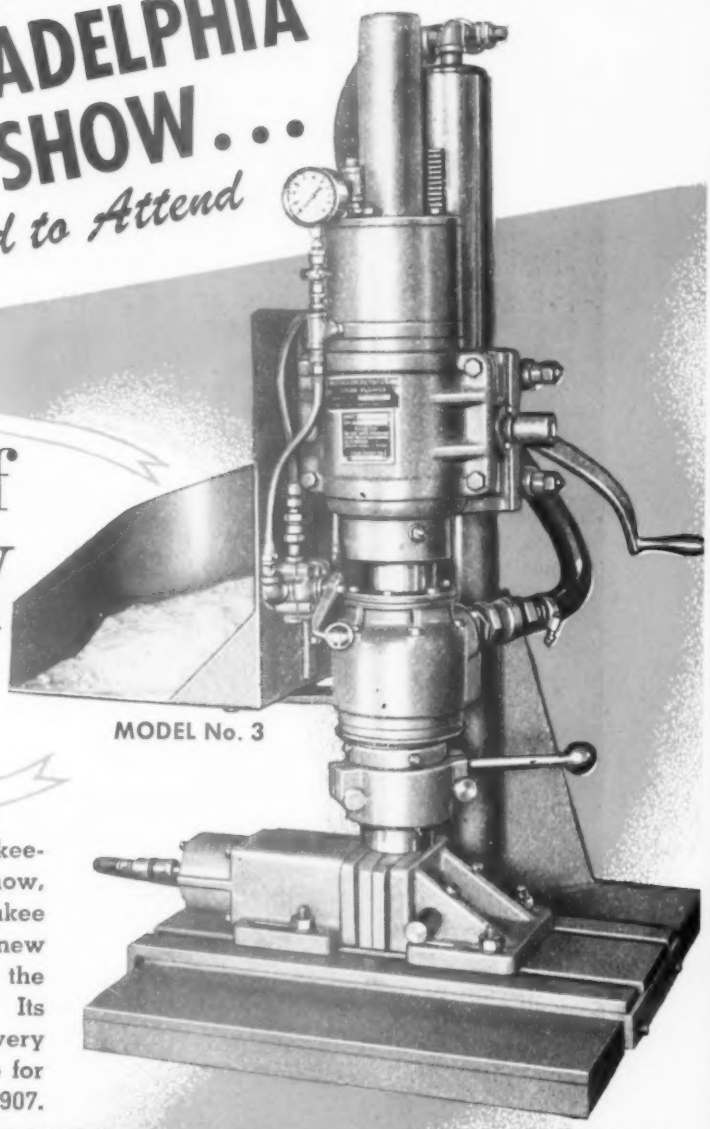
You are Invited to Attend

The "Baptism" of OUR BABY



MODEL No. 3

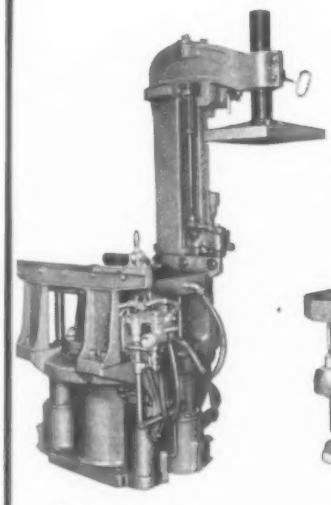
You'll have an opportunity to see the new Milwaukee-Taccone Core Blower at the Philadelphia Foundry Show, May 3-7. After 14 months of "diaper changing," Milwaukee Foundry Equipment Engineers are ready to have their new baby baptized and become a full-fledged member of the Milwaukee family. Frankly, we're proud of this baby. Its operation is EXPLOSIVE! It quickly responds to our every bidding. Its performance is the talk of the town. Judge for yourself. See it in action at the Show — Booth No. 907.

MILWAUKEE-TACCONE CORE BLOWER

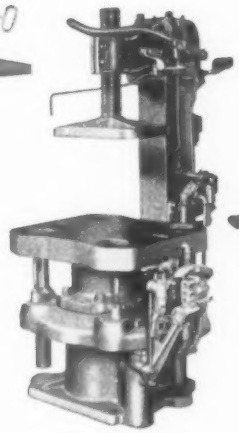
Bench style, EXPLOSION type Core Blower. Synchronized clamping and blowing increases speed and efficiency. Blown cores automatically released and can be removed as fast as blown. Blower steps 90 lb. line pressure up to 120 lb. blowing pressure. Blows intricate cores up to 4 lbs. in weight.

Also See These Molders

In addition to the Milwaukee-Taccone Core Blower, these three sturdy Milwaukee Molding Machines (illustrated at left) will be on display at the exhibit of the Milwaukee Foundry Equipment Company — Booth No. 907.



MODEL No. 166
Jolt Squeeze Strip Roll-off
Available in 6 sizes.



MODEL No. 165
Jolt Squeeze Pin Stripper
Available in 7 sizes.

MODEL No. 124
Portable Jolt Squeezer
10" and 12" Piston sizes.

MILWAUKEE *Foundry Equipment Co.*

3238 W. PIERCE STREET, MILWAUKEE 4, WISCONSIN, U.S.A.

(*Continued from page* 158)
a nationally-known figure as the speaker. Charles R. Hook, president, American Rolling Mill Co., Middletown, O., will discuss "Taking the Mystery Out of Business."—*Erle F. Ross.*

No. Illinois and So. Wisconsin

GUEST speaker at the Jan. 13 meeting of Northern Illinois & Southern Wisconsin Chapter of the AFA at Faust Hotel, Rockford, Ill., was E. T. Kindt, Kindt-Collins Co., Cleveland.

He began his talk with a brief history of the art of molding which dates back to the early Chinese. And he said that even now, patternmaking has much progress to make toward the goal of producing good castings. In his talk he dealt with several subjects relative to patternmaking: Interest in patternmaking must be stimulated; proper equipment must be selected and efficiency arranged in the plant; sound principles must be followed in figuring wood and metal pattern costs; pattern supplies need to be standardized; the engineering and making of permanent molds must be studied, and plastics, ceramics and plaster must be considered for future pattern application.

Mr. Kindt predicted that wood eventually will be replaced by a plastic—a material that will be hard, easy to cut and mold; impervious to moisture; having no need of a coating, and the ability to be melted, remelted and salvaged.

At the conclusion of his talk he showed a movie on the use of pattern supplies and equipment in a modern pattern shop.—*Carl L. Dahlquist, Greenlee Bros. & Co.*

Quad City

ABOUT 150 members and guests of Quad City Chapter of the AFA met Feb. 16 at Fort Armstrong Hotel, Rock Island, Ill., to hear L. P. Robinson, Werner G. Smith Co., Cleveland, talk on "Coreroom Practice."

Mr. Robinson stressed the need in many foundries for closer control of measurement of ingredients to give best results. A lively discussion period followed his talk.—*C. E. Marthens, Marthens Co.*

Central New York

EIGHTY members and guests attended the regular meeting of Central New York Chapter of AFA at Onondaga Hotel, Syracuse, New York, Feb. 13. L. W. Eastwood, supervising metallurgist, Battelle Memorial Institute, spoke on "Casting Unsoundness Caused by Gas Evolution."

Using a blackboard and slide pictures, Dr. Eastwood explained casting unsoundness caused by gas evolution from the melt during solidification in the mold, which is a problem common in the founding of all metals. Furthermore, according to the speaker, the methods of avoiding gas absorption, the possible methods of degassing melts, the two types of gas evolution and the two types of unsoundness caused by gas evolution are generally similar in all common casting alloys.

Dr. Eastwood listed gas evolution

(*Continued on page* 163)

WISCONSIN Chapter of the AFA and University of Wisconsin co-operated in sponsoring the eleventh annual Regional Foundry Conference, Feb. 12-13, Hotel Schroeder, Milwaukee. Some views of those attending the conference are shown here. Photos by John Bing, A. P. Green Fire Brick Co.

Speed-Up Non-Ferrous Grinding Jobs with NORTON CRYSTOLON WHEELS

THESE CRYSTOLON wheels—specially designed for grinding non-ferrous castings—feature a fast, smooth cutting action—insured by strong, sharp CRYSTOLON abrasive and filler treatments which prevent wheel loading—and they have extremely long life.

Here are some of the popular Norton wheel specifications which are speeding up production and cutting foundry grinding costs:

Floor Stands:

High Speed (6600 to 9500 s.f.p.m.)	(Aluminum & (Magnesium	37C24-N4B5 Res. #12 Treated
	(Brass & (Bronze	37C16-P4B5 Res. #12 Treated
Slow Speed (4000 to 6000 s.f.p.m.)	(Aluminum & (Magnesium	37C20-05V Vit. #12 Treated
	(Brass & (Bronze	37C16-P5V Vit. #12 Treated

Portable Grinders:

High Speed	(Aluminum & (Magnesium	37C24-N4B5 Res. #12 Treated
	(Brass & (Bronze	37C20-04B5 Res. #12 Treated

These recommendations may be used as a general guide in selecting wheels, but conditions surrounding each operation must be considered and may cause modifications.

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Abrasives - Grinding Wheels - Grinding and Lapping Machines - Refractories - Porous Mediums - Non-slip Floors - Norbide Products - Labeling Machines

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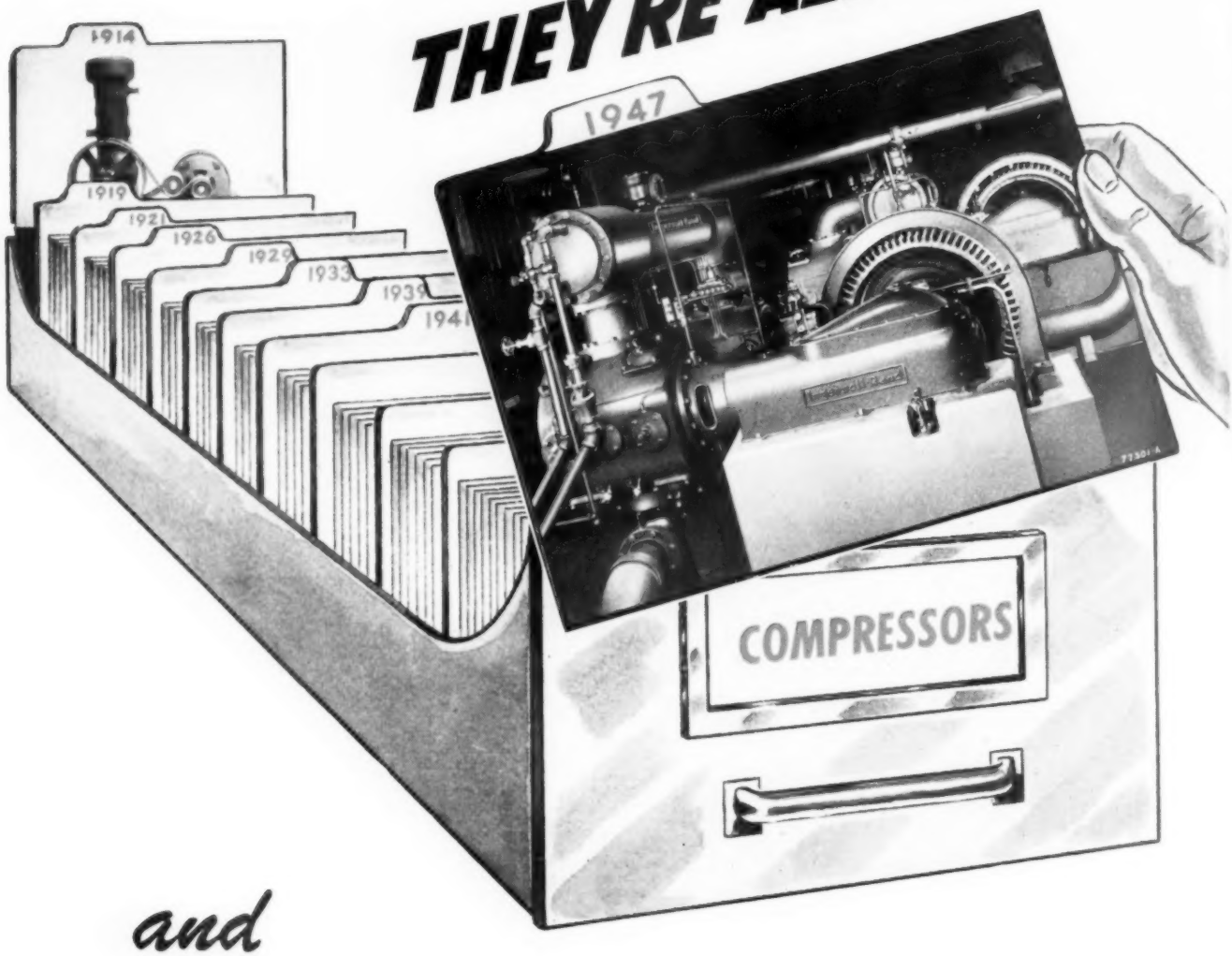

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ALL OPERATING TODAY!

34 YEARS of trouble-free service...and still in daily use. That's the record of a Wisconsin manufacturer's first Ingersoll-Rand compressor, installed in 1914.

Many times since then more capacity was needed. Each time another compressor was installed it was an I-R. Today there are 12 of them, newest of which are three Type XRE, direct-connected, synchronous-motor-driven units. From experience, this manufacturer knows that Ingersoll-Rand compressors are economical, dependable, and long-lasting.

It is interesting to note that all these compressors were purchased through the same I-R Engineer. In each case his knowledge and experience played a major part in the selection of the proper machine for the job.

When you need Air-Power, let one of our trained engineers give you the same help with your problems.

COMPRESSORS • AIR TOOLS
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OIL AND GAS ENGINES

Ingersoll-Rand

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184-1

(*Continued from page* 160)

as of two types: 1. Gas precipitates as a result of decreased solubility when the metal changes from a liquid to a solid. 2. Oxygen in solution in the melt reacts with a second constituent, such as hydrogen, carbon, or sulphur, to form a fairly insoluble compound such as H_2O, CO and SO_2.

Types of casting unsoundness are pin holes and microporosity. The first type may occur in all casting alloys, whereas the second is the most important in solid-solution alloys.—*John A. Feola, Crouse-Hinds Co.*

Western New York

SIXTY members and guests of Western New York Chapter of the AFA heard Norman Dunbeck, Eastern Clay Products Co., Jackson, O., talk on "Westonite and Molding Sands" in a meeting at Hotel Touraine, Buffalo, Feb. 6.

Mr. Dunbeck went into detail in describing the characteristics and use of chemically coated molding sand. He described practices followed by some of the foundries who are using the sand. Because the qualities of the sand are due to the plastic coating which is baked on each grain, the quantity of the coating must be maintained for proper control. He stated that green strength is a good watching point—low green strength, low amount of coating—high green strength, high amount of coating. The amount of coating can be determined by either an extraction test using benzine or by a carbon test.—*John R. Wark, Queen City Sand & Supply Co.*

British Columbia

BRITISH Columbia Chapter of the AFA has been extremely active in this, its first season since incorporation. While only officially inaugurated in October, 1947, the directors had planned a full program for their members.

Regular monthly meetings are held on the third Tuesday of each month at the Medical Dental Auditorium, Vancouver, B. C., when capable speakers address the membership on technical foundry subjects. While the membership of the new group has passed the eighty mark, over fifty have been in attendance regularly at these meetings.

The first project was to conduct a six-weeks' educational course on foundry fundamentals at the Vancouver Technical School with the cooperation of the Vancouver City Night Schools. Nearly fifty applied and are going "back to school" to learn modern and scientific methods of foundry routines. Lectures include the subjects of casting design, cupola practice, sand control and testing, molding, coremaking, and other phases of foundry work. Prof. William Armstrong of the Mining & Metallurgy Department, University of British Columbia and chapter director, is chairman of the education committee. Lecturers of the course include R. Shoebridge, Dean H. Goard, H. Brownrigg, Thomas Cowden and Fred Bey, all prominent in the Vancouver foundry industry.

The second project was the local apprenticeship contest. Four groups of apprentices competed—iron molding, steel molding, nonferrous molding and patternmaking. Over thirty foundry apprentices from Victoria, New Westminster and Vancouver participated. Work of the contestants was judged by a committee of local foundry craftsmen and valuable prizes donated by several foundry operators were awarded for the best work completed in each class. The contest was held Feb. 28 at the Technical School new foundry station, and local steel foundries and pattern shops. The winning work from each class will be sent as the British Columbia entry in the national AFA apprenticeship contest at Philadel-

COREBOX MAKER: Olen L. Miller is shown demonstrating the Miller-Wellman Corebox Machine at the Jan. 14 meeting of the New York Branch, National Association of Pattern Manufacturers, at 2 Park Ave., New York. About 42 men attended the dinner meeting and witnessed the demonstration

CANTON: Informal discussion group at the Jan. 15 meeting, Canton District Chapter of the AFA, Massillon, O. Bottom row, left to right: Pat Dwyer, the Foundry, Cleveland; C. F. Bunting, Pitcairn Co., Barberton, O.; L. P. Robinson, Werner G. Smith Co., Cleveland and Otis Clay, Tuscora Sand Co., Canal Fulton, O. Top row, left to right: D. C. Williams, Ohio State University, Columbus, O.; L. R. Jones and Chester Williams, Massillon Steel Casting Co., Massillon, and Charles Hess, Hess-Snyder Co., Massillon

phia the week of May 3-7.

Committee chairman of this project is J. A. Dickson, Dickson Foundry Co., Vancouver. Other members of the committee are: H. Brownrigg, B. C. Research Council and W. Catherall, Vancouver Technical School.—*Norman Terry, Canadian Sumner Iron Works Ltd.*

Northeastern Ohio

PATTERNMAKING division of Northeastern Ohio Chapter of the AFA was in charge of the program at the regular monthly meeting held at the Cleveland Club, Cleveland, Feb. 12. Patternmakers' Night is an annual affair, and this meeting was attended by 225 members and guests.

Main speaker was Ralph D. Speirs, superintendent of patterns and castings, Wright Aeronautical Corp., Woodridge, N. J. He spoke on the interrelationship of patternmaking, purchasing and the foundry.

Mr. Speirs commented that a patternmaker must have vision and imagination to picture the finished casting which is to be made from his pattern. Models of the final casting help him to plan his work and make the correct equipment. He added that the patternmaker should consult the foundry to determine how the job is to be run and then make the pattern to comply as much as possible with practice in the foundry.

One patternmaker should be in charge of lining up the entire job, co-ordinating patternmaking, corebox work and foundry practice. This man should be on the job in the foundry to supervise complicated cored jobs.

Mr. Speirs went on to say that the foundry's obligation is to furnish the patternmaker with complete information, specifications and drawings. It is to the foundry's advantage, he said, to avoid trying to save money on patterns. To illustrate, he compared patterns with machine tools as important productive tools.

In speaking of apprentice training, he commented that the average age of patternmakers in the United States is 42 years. There is a great need for training apprentices to replace journeymen who become lost to the industry.

David K. Stewart, retired banker, was the coffee speaker. Underlying the humorous tone of his talk, were some serious thoughts which he presented on a philosophy of living. Some of these thoughts were expressed in the statements that happiness is not a state of affairs, but a state of mind, and that optimistic thinking leads to success and pessimistic thinking leads to failure.—*Robert H. Herrmann.*

Michiana

DIELECTRIC Heating for Core Baking" was the subject of a talk given by J. W. Goring, sales engineer, Arthur B. Sonneborn Co., Grand Rapids, Mich., before the Michiana Chapter of the AFA in February.

Mr. Goring stated that dielectric baking is most applicable to long runs of similar sized cores, and advantages in savings will be derived if it is possible to synchronize coremaking with molding and pouring. For job foundries, where a large variety of cores are made, dielectric baking is not practical, in Mr. Goring's opinion.

During the afternoon approximately 65 chapter members took advantage of an invitation extended by the Oliver Corp., through Martin Lefler, plant manager, to visit its foundry. The Oliver foundry recently was completely mechanized and can be classed as one of the largest and most modern foundries in the country.—*S. F. Krzeszewski, American Wheelabrator & Equipment Corp.*

Twin City

TWIN CITY Chapter of the AFA held its regular monthly meeting at the Covered Wagon Restaurant, Minneapolis, Feb. 5. Tom E. Barlow, sales manager, Eastern Clay Products Inc., Jackson, O., addressed the group on the subject of Westonite.

Mr. Barlow sketched a brief history of materials used for making molds. The original intention, according to Mr. Barlow, was to eliminate not only clay and water from molding sand, but actually the sand itself. Dr. Weston visualized pouring castings in a pure refractory plastic, but since this was uneconomical, he used sand grains as a filler for the plastic. The original product was a "waterless sand" composed of sand grains coated with a carbon-source chemical and knit together with organic solvents. The material was stable and never dried out but possessed a number of disadvantages.

Present product is a compromise between the original material and regular synthetic molding sand and consists of a relatively fine silica sand each grain of which has a baked-on coating of high carbon plastic refractory material; a liquid consisting of a carbon plastic, organic solvent, emulsifier and a catalyst which controls combustion, and a dry material which is about 93 per cent

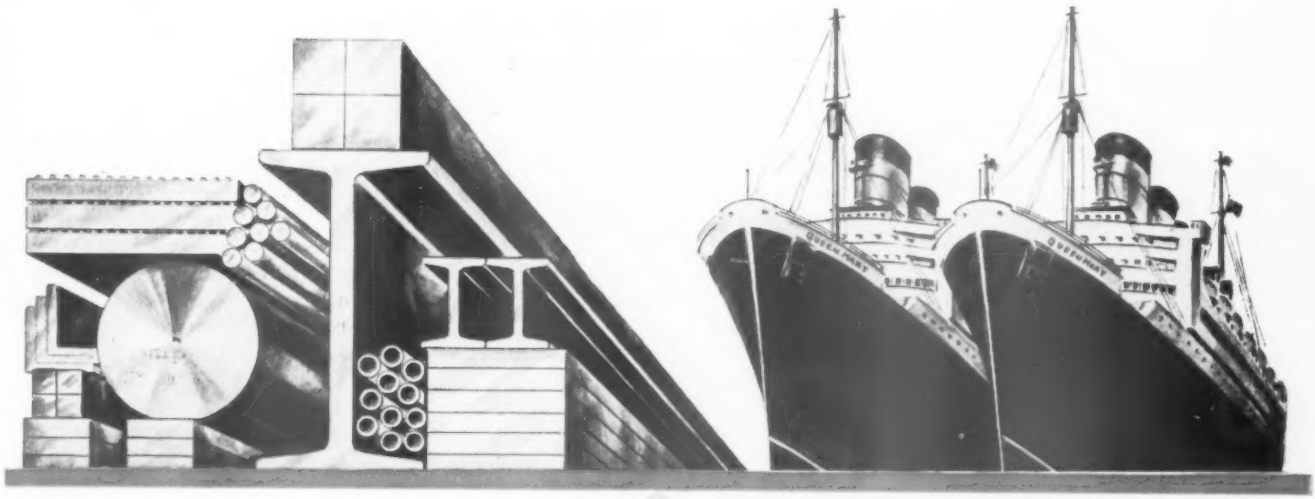
(*Continued on page* 166)

CENTRAL OHIO: R. L. McIlvaine, National Engineering Co., Chicago, shown above at the right, spoke on "Foundry Mechanization" at the Jan. 26 meeting of Central Ohio Chapter of the AFA. View of the speakers' table is shown at left. Photos courtesy of Wilfred H. White, Jackson Iron & Steel Co., Jackson, O.

B&W JUNIOR FIREBRICK

help increase steel output by

162,000 tons



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QUEEN MARY!

Production figures show that remarkable savings are being realized through the use of B&W Junior Firebrick.

For example, the first quality firebrick in the suspended roof of a continuous reheating furnace had to be replaced after heating every 45,000 tons of steel. But—when the roof was rebuilt with *B&W Junior Firebrick*, 207,000 tons were run through without shut-down for repairs! And, at the end of the run, the roof was thin but otherwise in good condition.

B&W Junior Firebrick help you increase output and reduce costs by reducing the refractory replacement rate and by eliminating frequent furnace outages. Your local B&W Refractories Engineer will be glad to discuss your refractories problems.

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B&W REFRACTORIES PRODUCTS

B&W 80 FIREBRICK • B&W JUNIOR FIREBRICK
B&W 80 GLASS TANK BLOCKS • B&W INSULATING FIREBRICK
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REFRACTORIES DIVISION
GENERAL OFFICES: 85 LIBERTY ST., NEW YORK 6, N.Y.
WORKS: AUGUSTA, GA.

(*Continued from page* 164)

plastic carbon without the solvent.

Mr. Barlow said that for use in a foundry the chemically bonded sand must be mixed with approximately 2.5 per cent western bentonite, 2.25 per cent water and one quart of liquid Westonite per 1000 lbs of the prepared sand.—*O. J. Myers, Werner G. Smith Co.*

Cleveland

OFFICERS for the coming year were elected by the Cleveland Nonferrous Society at a meeting at Hotel Cleveland, Cleveland, Feb. 9. Dave Kennedy, Gluntz Brass & Aluminum Foundry Co., is chairman; R. O. Burton, Holland Trolley Supply Co., is vice chairman and E. J. Reick, Hoffman Bronze & Aluminum Casting Co., is secretary. All are from Cleveland.

Mr. Shirley, chief metallurgist, U. S. Reduction Co., East Chicago, Ind., spoke on the making of aluminum ingot. He said that ingot is more uniform today due to better refining operations and better control. He described the process of ingot manufacture from the sorting of purchased scrap until it is moved out to the customer in compliance with his specifications.

George Dreher, Foundry Educational Foundation, summarized results of his recent tour of colleges where he discussed the foundation's educational program. According to Mr. Dreher, colleges are not interested in the development of specialists as this restricts opportunities for the graduate. He added that management-minded men are at a premium today, and the foundry industry is mainly interested in an enlargement of the supply of men suited for supervision work.

Ed Metzger, Wellman Bronze & Aluminum Co., Cleveland, discussed the series of six lectures on cost procedures being held at Fenn College, Cleveland. Proceeding of these lectures will be recorded and the material sent to the national office for distribution to other chapters.—*Ed Metzger, Wellman Bronze & Aluminum Co.*

Eastern Canada and Newfoundland

PAST and Present Trends of the Pattern Industry" was the subject of E. T. Kindt, Kindt-Collins Co., Cleveland, guest speaker at the Feb. 13 meeting of Eastern Canada and Newfoundland Chapter of the AFA at Mount-Royal Hotel, Montreal.

Mr. Kindt's talk covered four main topics: 1. Selection of proper equipment and the most efficient layout for a new pattern shop. 2. Principles employed in figuring costs on wood and metal patterns. 3. Principles employed in selling patterns and pattern equipment. 4. The future application of plastics and ceramics to pattern production. Mr. Kindt also showed a movie depicting a modern pattern shop and pattern equipment.

The largest audience of the year was in attendance. Nearly 160 members and friends and a large delegation from various trade schools, apprentices from the patternmakers' society and a large number of patternmakers were present.—*H. E. Francis, Jenkins Bros. Ltd.*

Southern California

CORES can be baked electronically in 40 seconds, according to J. W. Cable, Induction Heating Corp., New York, who addressed the January meeting of Southern California Chapter of the AFA. By this method, cores are heated and baked uniformly throughout, rather than from the outside toward the center.

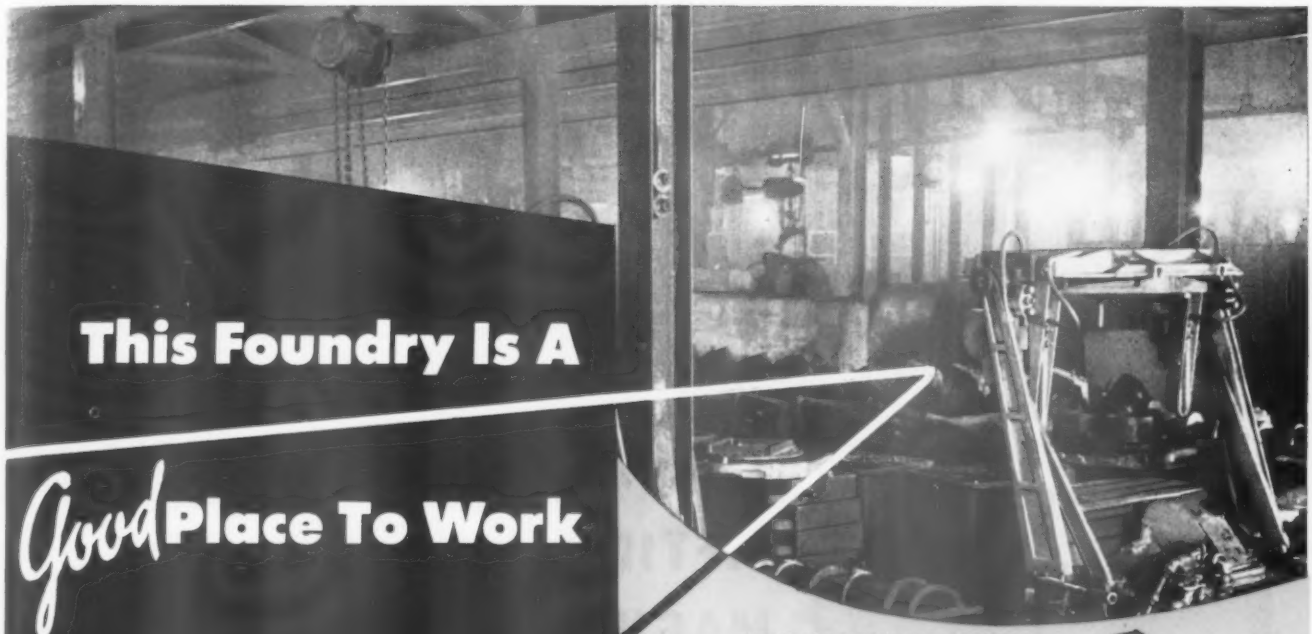
He went on to say that synthetic resins are suitable binders for cores baked by the electronic process and that cores made with plastic driers can be held to extremely close tolerance. He concluded by saying that the volume of gas driven off during dielectric baking is extremely small.

A motion picture, "Malleable Casting Production," was shown by Otto Rosentreter, field engineer, National Engineering Co. The film demonstrated operations of molding, pouring, shakeout, cleaning, sand preparation, and other phases of production, as practiced at the Moline Malleable Iron Co., St. Charles, Ill.

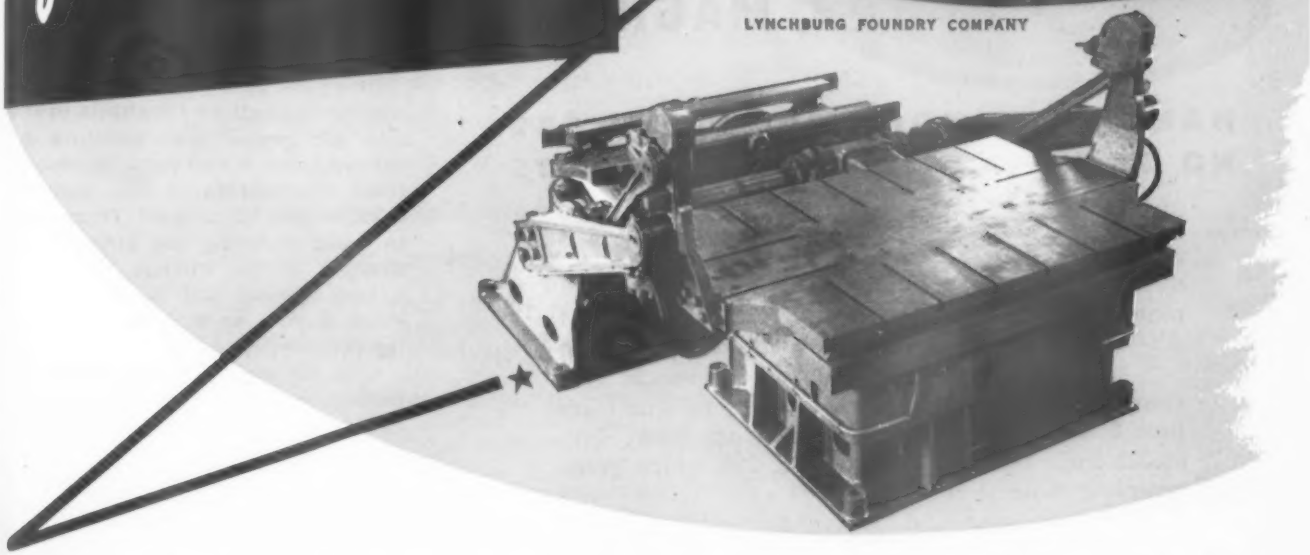
Charles A. Barnett, Foundry Equipment Co., Cleveland, addressed the

(*Continued on page* 168)

This Foundry Is A *Good* Place To Work



LYNCHBURG FOUNDRY COMPANY



This Southern foundry, producing cast iron pressure pipe, special castings, chilled plows and parts, is another good place to work. Good management planning and careful attention by plant personnel to important details combine to make it an outstanding example to others. Sequence of operations, from raw materials to finished product, is fully co-ordinated. Close laboratory control, through chemical and physical testing and analyses, is constantly maintained. At an Open House last fall, over 1500 people were shown through the plant, reflecting the broad public relations policy of the company. Three mechanical molding, pouring, assembly and shakeout lines constitute only a part of the plant's manufacturing facilities. Health and safety of all personnel is a prime consideration.

Herman Pneumatic molding machines are used extensively in this plant to maintain quantity and quality production. The machine illustrated is simple to operate. One valve controls all operations and gives fast, steady hydraulic action for mold rollover and pattern draw. A timer controls all jarring. Any size mold is clamped and unclamped instantly. Inquiries to the address below will receive prompt attention.

MEMBER

HERMAN MOLDING MACHINES

HERMAN PNEUMATIC MACHINE CO., UNION BANK BUILDING, PITTSBURGH, PENN.

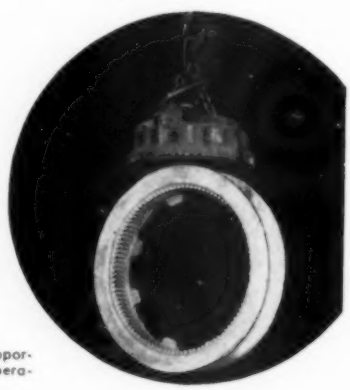
DINGS
High Intensity
LIFTING MAGNETS

HARD-TO-HANDLE MATERIALS ARE NO PROBLEM WITH THESE MAGNETS

Just a touch of the electric controller . . . and the toughest material handling jobs are easily expedited. *Powerful* Dings Lifting Magnets handle steel plates, bars, castings, rods, tubing, wire and all other forms of magnetic material rapidly . . . easily . . . economically . . . with big labor savings. No straps, slings or hooks needed. Built in diameters from 8 to 65 inches . . . to carry loads from 50 to 65,000 lbs. Write for catalog No. 220 which gives complete data.

They Stay Stronger . . . Longer
Some of the reasons why:

- **Shock absorbing construction**—Coils kept in place despite abuse. Ribbed design used for tough service.
- **Water and weather-proofing**—Coils are vacuum-impregnated and sealed in watertight casing.
- **Long trouble-free life**—Engineered and built for toughest service.
- **Balanced magnetic circuit**—Copper wire and steel proportioned to give maximum lifting capacity with lowest temperature rise.



An eight-foot diameter casting just out of the foundry flask is swung away and stacked easily with a Dings Lifting Magnet.

DINGS MAGNETIC SEPARATOR COMPANY
4708 West McGeogh Avenue • Milwaukee 14, Wisconsin

"HIGH INTENSITY" **Dings**

Separation Headquarters Since 1899

(*Continued from page* 166)

Southern California Chapter of the AFA at its February meeting. In his talk, Mr. Barnett brought out the fact that good core baking equipment often spells the difference between success and failure in attaining correct strengths of baked cores.

With scientifically designed apparatus, he went on to say, temperature tolerances can be controlled to within two or three degrees. He illustrated with slides phases of his talk on various types of mold drying furnaces, pit dryers and portable dryers.

Chapter President Henry E. Russell, Eld Metal Co. Ltd., Los Angeles, announced successful progress of apprentice class organization.—*Maurice Beam*

New England

GUEST speaker at the regular meeting of the New England Foundrymen's Association held Feb. 11 at the Engineer's Club, Boston, was Joseph B. Stazinski, General Electric Co., Lynn, Mass.

He spoke on foundry practices including suggestions for cupola operation and proper sand mixtures for various types of castings. He showed some illustrations of the complete manufacture of a mold from start to finish including the pouring and cleaning of the casting. This was a typical mold and illustrated machine molding as well as proper gating and risering.

Over 100 members and guests were present at the meting and many took part in the discussion following the speaker's address.—*Merton A. Hosmer, Hunt-Spiller Mfg. Corp.*

Canton

THOMAS W. CURRY, Lynchburg Foundry Co., Lynchburg, Va., predicted to 110 members at the Feb. 12 meeting in Swiss Club, Canton, O., that future developments in chemically coated molding sands will greatly reduce production costs in the foundry. He said that such molding sands also will produce castings requiring less cleaning and bring them nearer to pattern dimensions.

He went on to say that the Lynchburg Foundry Co. pioneered most of the work in its jobbing foundry and developed process and control methods until the sand now is used in the production of complicated castings up to 650 pounds in weight. Mr. Curry stated that there is a great deal to be learned about chemically coated sands, and it can still be considered a research problem.

Luther Beinkee and James Mesker,

(*Continued on page* 170)

ANNOUNCING...

A RESEARCH AND ADVISORY SERVICE ON PROBLEMS RELATING TO

CORE BLOWER BOX DESIGN

***We invite you to send your core blowing problems to us . . . if our years' of experience don't provide the answer, we'd like to study the problem and find the answer!**

FOR INSTANCE

Through research and experience, we have found that core box maintenance has been reduced as much as 300% through the proper design and the application of our *Seal-Tite Ribbing*.

The Abrasive Resistance of Various Metals **has had our careful study so that we can tell exactly what to expect when a core box is put into production. The accompanying table shows the relative resistance to abrasion of fifteen materials which have been tried in core box construction.**

BLAST RESISTANCE TEST RESULTS

Material No.	Efficiency
1	145%
2	135%
3	100%
4	76%
5	70%
6	63%
7	50%
8	50%
9	44%
10	42%
11	41%
12	35%
13	32%
14	20%
15	10%

If you aren't getting the core box life you think you should or if you are planning new core box equipment, we invite you to ask for our Advisory Service. We will welcome the opportunity to give you the benefit of the specialized experience and research which we have devoted to these problems.

New BULLETIN on Core Blowing

* Scheduled for publication in the near future is our new Bulletin "F" on Core Blowing which will contain considerable information of practical value. We invite you to write for a copy to be sent as soon as it is off the press.

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HAUSFELD FURNACES

FOR "ALL-OUT" PRODUCTION IN NON-FERROUS FOUNDRIES

Provide the Utmost in Speed Production and Safety

FURNACES FOR
BRASS • ALUMINUM • MAGNESIUM
AND ALL OTHER
NON-FERROUS ALLOYS

The Campbell-Hausfeld Co.
300-320 MOORE ST. HARRISON, OHIO

(*Continued from page* 168)

Plaster Pattern Process Co., Cleveland, gave slide-illustrated talks on a process for making patterns by a plaster method.—*Nils E. Moore, Wadsworth Testing Laboratory.*

Central Ohio

MALLEABLE iron founding was discussed at the February meeting of the Central Ohio Chapter of the AFA by James Lansing, consulting engineer, Malleable Founders' Society, Cleveland. Mr. Lansing traced malleable iron industry history from the days of Reaumur and Boyden until the present, including the development of the manufacturing process, annealing, cleaning, grinding and straightening. Illustration of unique gating systems used for special purposes within the industry were of interest.

L. C. Tate, Ford Motor Co., addressed the steel section on "Measurement of Temperatures of Molten Metal." Radiation pyrometers were discussed and a method of using these instruments in conjunction with immersion tubes was explained. The platinum platinum-rhodium thermocouple protected with a silica sheath and a refractory block to protect against slag attack, and the development of the tungsten-graphite thermocouple for immersion in metals up to about 2650° F also were described.

Cpl. K. K. Elder, Ohio State Highway Patrol, was the coffee speaker. He presented an interesting and instructive illustrated talk on highway safety, pointing out the numerous dangers of high speed driving, inattention, and inadequate maintenance of vehicles.

April meeting of the chapter, to be held at Chittenden Hotel, Columbus, April 26, will have Jack Trantin Jr., president, Youngstown Alloy Foundry Co., Youngstown, O., as the speaker. He will discuss "Centrifugal Castings."—*H. W. Lownie Jr., Battelle Memorial Institute.*

Cincinnati

APPROXIMATELY 150 members and guests of the Cincinnati District Chapter of the AFA heard Ralph L. Lee, employees co-operative staff, General Motors Corp., speak on "Man to Man on the Job" at Engineering Society Headquarters, Cincinnati, Jan. 12.

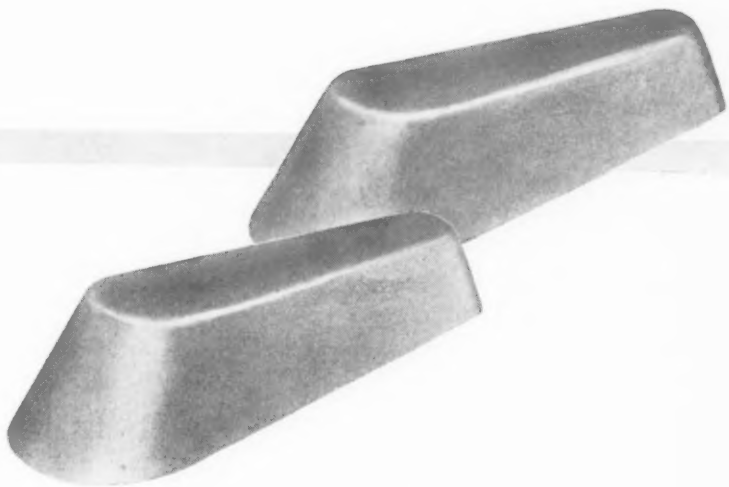
Dr. Lee stressed the following points:

Employees cannot be expected to take the same interest in the business as management does.

It is imperative to provide every

(*Continued on page* 172)

High Sipi I.Q.*



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No matter how much you order . . . one . . . one hundred . . . or one thousand . . . SIPI ingots reach you true to specifications and consistently high in quality. This IQ* is the result of strict laboratory standards and close metallurgical control . . . from raw material to finished ingot.

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Spencer Foundry Turbo

SPENCER FOUNDRY PROTECTION

for Men, Melts and the Pours

Spencer Turbos are the accepted standard for foundry cupolas because they provide maximum reliability of the air supply over long continuous service. Constant volume or weight of air can be maintained by hand or automatic control whichever is preferred.

High dust counts and shut-downs must be kept to a minimum in the modern foundry.

Spencer Vacuum Cleaners, stationary or portable, remove overhead dirt, clean patterns, molds and castings, and reclaim foundry sand. It helps keep the dust count down.

Both machines are of the centrifugal type with wide clearances, light weight impellers, low peripheral speeds, and only two bearings.

The result, a quiet running machine which requires no special foundations. For reliability, we can refer you to Spencers that have been in service 25 to 40 years.

ASK FOR THESE SPENCER BULLETINS

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No. 137	Boiler Cleaning
No. 102	Portable Vacuum Cleaners
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No. 143	Pneumatic Conveying
No. 142	Turbo-Agitation
No. 127	Turbo-Compressors
No. 109	Gas Boosters
No. 112	Foundry Blowers

Cleaning molds with Spencer Vacuum

332-D

SPENCER HARTFORD

THE SPENCER TURBINE CO.

HARTFORD 6, CONN.

(*Continued from page* 170)

opportunity for those employees who wish to make a name for themselves on their present jobs.

It is also necessary to make it possible for the employee to see the finished product, to enable him to realize the importance of his individual efforts.

Everything possible should be done to make employees' jobs run smoothly by having all the kinks worked out and everything kept orderly.

Employees should be imbued with the realization of the importance of the foundry. Few industries could start and keep going without the

RALPH L. LEE

foundry industry. Founding is a noble craft and one to be proud of.

Rank consciousness should be eliminated, and no job should be done that is not necessary. If the job is necessary to the production of castings, regardless of how menial, that employee should be respected for the work he is doing, and he is entitled to job dignity and recognition.—*C. H. Fredricks, Cincinnati Milling Machine Co.*

Pittsburgh

JAN. 19 meeting of Pittsburgh Foundrymen's Association featured a talk on "Nonferrous Foundry Practice" by W. B. George, R. Lavin & Sons Inc., Chicago.

Mr. George outlined the results of his tests in demonstrating the fallacy of using test bar values as representative of those of the casting. On the standard alloy 85-5-5-5 his test showed a marked variation in physical values with any change in bar section.

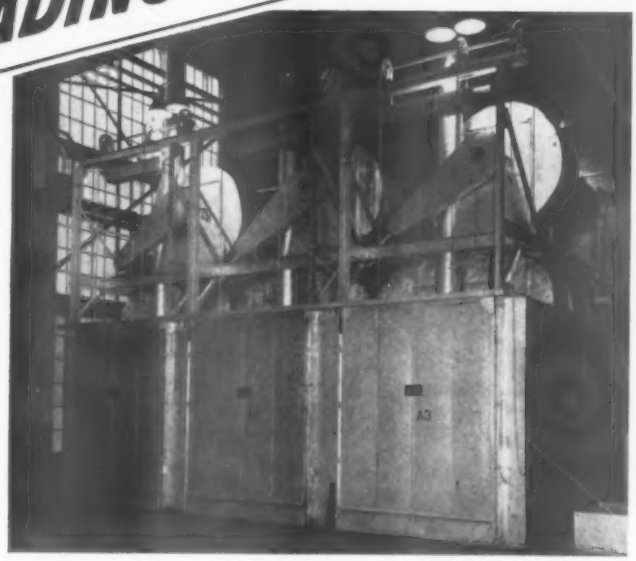
The speaker demonstrated his procedure of arriving at the true cost of castings and placed emphasis on the necessity of allowing for the hazard phase of casting. This element of cost, in his opinion, is one that is

(*Concluded on page* 174)

For Oven Requirements LEADING FOUNDRIES turn to

CARL-MAYER

Repeatedly



A battery of Carl-Mayer Rack Type Ovens recently installed for Large Aluminum Co.

TWO OVEN *musts* BY LEADING FOUNDRIES

- ✓ Uniform baking, fast baking, fuel economy.
- ✓ Rugged oven construction. Dependable heating mechanism for longer, trouble free performance.

Carl-Mayer Oven Equipment *must* be the answer, to gain such recognition in a highly competitive market.

Why not profit by our experience—more than 28 years of unusual achievements in serving individual needs in the foundry industry? *Write for Bulletin.*

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Golden Foundry Co. Inc.
Henry Kaiser Corp.
W. O. Larson Foundry Co.
F. E. Meyers & Bro. Co.
Oil Well Supply Co.
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Shenango Penn Mold Co.
Studebaker Corp.
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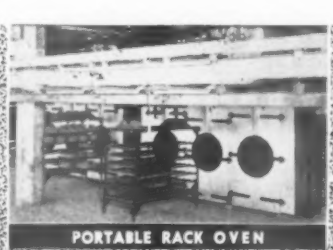
A. C. Williams Co.
Whiten Machine Works
Whiting Corp.

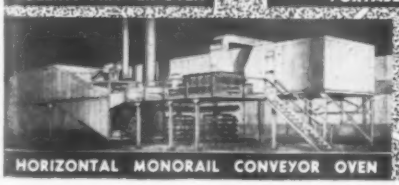
ROLLING DRAWER OVEN



PORTABLE RACK OVEN

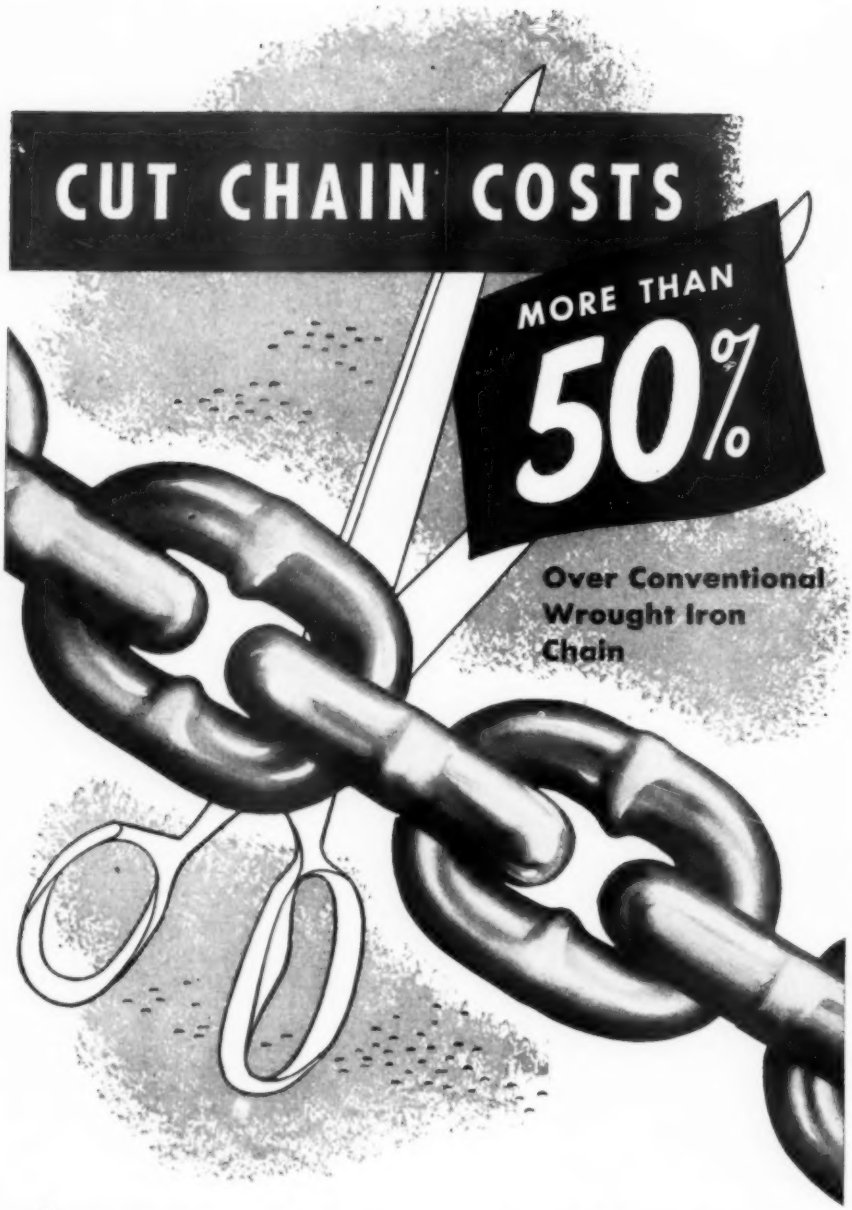
VERTICAL OVEN

CAR TYPE OVEN



HORIZONTAL MONORAIL CONVEYOR OVEN

The CARL-MAYER Corp.
3030 EUCLID AVE. CLEVELAND, OHIO
CORE AND MOLD OVENS



IT'S possible to cut chain costs 50%, when you use TM Alloy Steel Chain. It has five to fifteen times the life of wrought iron chain (depending on the type of work)...because it has twice the tensile strength... far greater resistance to shock, to grain growth and to work-hardness. It never requires annealing. And it's tougher... Brinell Hardness Tests show 270 to 300. It all adds up to less than half the replacement costs...less than half the maintenance costs and twice the safety factor of ordinary chain. TM Alloy Steel Chain is quickly recognized by its double weld. For specifications and prices contact your local mill supply distributor today or write the factory direct.

S. G. TAYLOR CHAIN CO.
Dept. S-4, Box 509, Hammond, Ind.

TAYLOR MADE ALLOY Chain

"THE BEST BY TEST SINCE 1873."

(*Continued from page* 172)
commonly neglected.

Mr. George related in detail the proper arrangement and operation of the standard crucible type melting equipment for nonferrous alloys. He stressed the necessity of atmospheric control and, in his experience, found the furnace atmosphere should vary somewhat with the weight of the casting being poured.

He stated that gas absorption is a direct function of time of exposure and temperature. Mr. George advised against prolonged heating after metal is ready to pour.

Ralph L. Lee, public relations department, General Motors Corp., spoke on "Leadership and What It Takes" at the Feb. 16 meeting. Mr. Lee brought out failings that are characteristic of all men. It was a talk directed to management and one of particular value to foremen. Mr. Lee promised to send copies of this talk as well as of some other articles of his to all those who attended the meeting.—*Joe C. Sullivan*

Tri-State

A CAPACITY crowd filled the dining room of Wilder's Restaurant, Joplin, Mo., for the Feb. 20 meeting of Tri-State Chapter of the AFA.

William B. McFerrin, Electro Metallurgical Sales Co., Detroit, gave a timely and interesting discussion regarding alloy steels and cast irons. Mr. McFerrin emphasized various late silicon alloy additions for gray iron.

Cecil Bentley and Clyde A. Beagle, Webb Corp., Webb City, Mo., were in charge of arrangements for the meeting.—*F. E. Fogg, Acme Foundry & Machine Co.*

Ohio State

OHIO State University Student Chapter of the AFA and American Ceramic Society held a joint meeting Feb. 3 to hear H. M. Kraner, research ceramic engineer, Bethlehem Steel Co., speak on "Foundry Refractories."

Effects of alumina silicate on sand, and the effect in turn the sand has on the casting were descussed by Mr. Kraner. He also discussed bonds for sands and described the form sand grains take when under pressure.—*Eldon Boner*

Foundry Addition

Electric Steel Foundry Co., Danville, Ill., plans an addition to its plant which will more than double its present 5000 sq ft of floor space.

LOWEST CLEANING COST PER TON

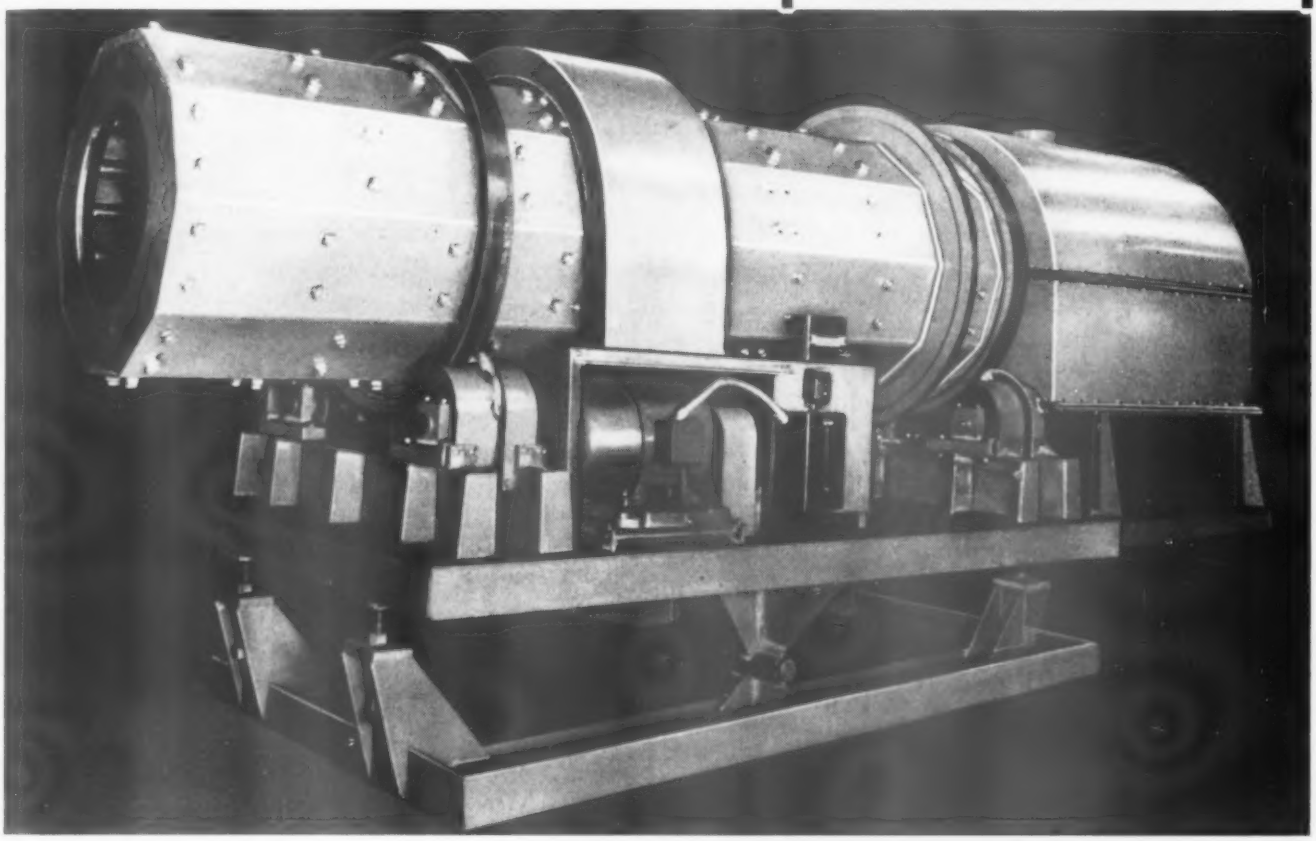
METALS ARE STILL SOARING . . . EVERY POUND IS PRECIOUS . . . LET THIS RANSOHOFF MACHINE SAVE YOUR SPRUE

The cleaner the sprue the better the re-melt! With sand removed after shake-out remelts are higher in quality and silicon content is easier to control.

NO CLEANING MEDIUM NECESSARY. This RANSOHOFF CLEANING MILL cleans sprue (and castings, of course) thoroughly, economically, speedily.

RANSOHOFF CLEANING MILLS

CLEANING SPRUE THOROUGHLY BEFORE RE-MELTING MEANS A LOT TODAY



RANSOHOFF WET CLEANING MILLS BUILT IN ANY CAPACITY Designed, precision-engineered and built to handle castings of any size in any foundry. THEY SAVE YOU MONEY. Simple . . . gentle . . . no rust . . . no dust . . . no dust-collecting systems . . . no destructive mill wear.

Save 30% to 70% ON YOUR CLEANING COSTS

SEND US A SAMPLE BATCH

We will submit complete reports without obligation on your part.

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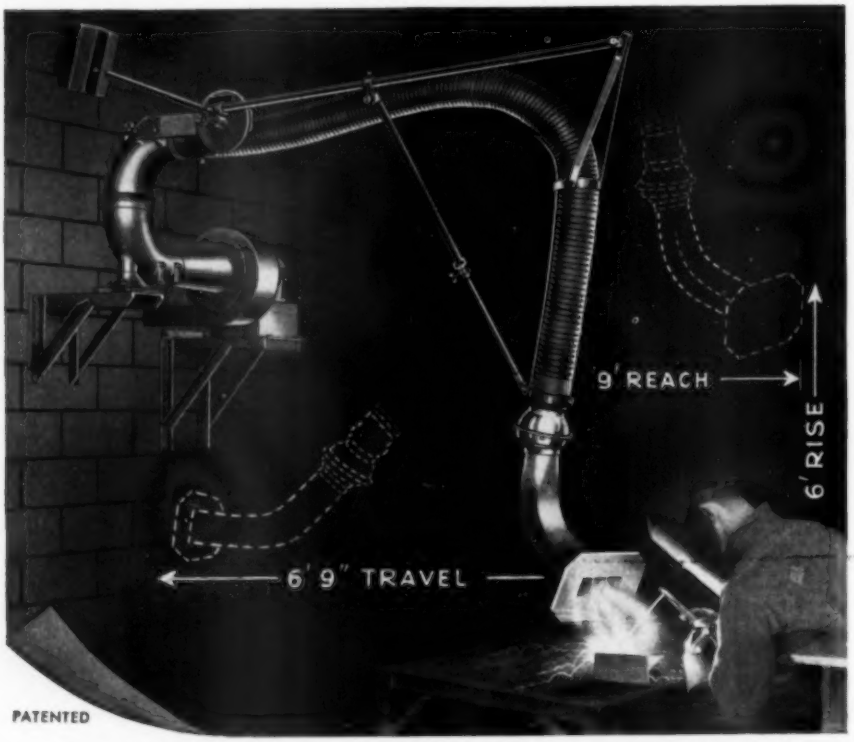
"I WORK IN CLEAN FUME-FREE AIR —thanks to our RUEMELIN FUME COLLECTOR"

Welding shops equipped with Ruemelin Fume Collectors are assured of a clean shop atmosphere. Noxious fumes, heat and smoke are eliminated *at their source*, thus improving working conditions, lessening fatigue and paving the way for increased plant production.

The Ruemelin Fume Collector hood can be instantly placed where needed anywhere in the booth welding area. No tedious adjustments necessary. Just pull the inlet hood to the welding position and you are ready to go. Approved by state industrial commissions and by compensation insurance companies. Simple to install. Thousands in service. Many users send in repeat orders. Write for bulletin 37-C today.



Standard Model D-5310 with hood reaching out 9 feet from wall. Also available in Long Reach Model D-5342 with hood reaching out 15 feet from wall.

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MANUFACTURERS AND ENGINEERS • SAND BLAST AND DUST COLLECTING EQUIPMENT • WELDING FUME COLLECTORS

A 5187-⅝

USES SODA ASH FOR DESULPHURIZING

(*Continued from page* 79)

uninterrupted operation would be impossible without the use of large quantities of scrap in the cupola mixtures. It is, of course, well known that, all other things being equal, a cupola mixture containing relatively high percentages of cast iron scrap will result in the production at the cupola spout of molten iron higher in sulphur content than a cupola mixture containing less cast scrap and more pig iron. In spite of this, through the use of fused soda ash (fused soda ash is marketed under the trade name Purite) we have been able to maintain the sulphur content of our irons under the maximum allowable limits, regardless of whether these limits be prescribed by federal specifications, customer's specifications, or whether they be self-imposed.

Provide Extra Fluxing Material

Before any iron is charged, depending upon the size of the cupola, we place on the coke bed from 8 to 12 blocks of soda ash (each weighing between 4 and 5 lb) and an amount of limestone equal to that used on three ordinary cupola charges. In addition we use, on each of the first nine charges placed in the cupola, 6 lb of soda ash per ton of metal charged. The purpose of this extra fluxing material is to provide a large volume of fluid slag as near the beginning of the heat as possible. With this procedure, slag starts flowing from the cupola within 30 to 60 minutes after the blast is turned on which is vital to the successful operation of front slagging cupolas. In addition, the slag provides a protective blanket for the molten metal in the cupola well, with a resultant reduction in heat loss from the incoming blast.

Before metal is tapped from any of our cupolas, the teapot ladle or forehearth used in conjunction with it is thoroughly preheated with an oil torch. The temperature of the refractory walls is not less than 2400° F and the time required to attain this temperature is usually 3 to 4 hours. After the cupola has been tapped out and molten iron has reached a sufficient depth (6 or 8 in.) to seal or cover the hole at the bottom of the teapot spout, blocks of soda ash are added in quantities prescribed by experience, type of cupola charge being used, the grade of iron being produced, type and quality of melt-

(*Continued on page* 178)

THE JEFFREY MANUFACTURING COMPANY

ESTABLISHED 1877

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Complete Line of Material Handling, Processing and Mining Equipment

COMBS GYRATORY FOUNDRY RIDDLES

VISIT OUR EXHIBIT AT PHILADELPHIA IN MAY

2-Day Delivery now on all Combs Riddles

TYPE CS—$270.00 COMPLETE
F.O.B. LEAVENWORTH

COMBS GYRATORY FOUNDRY RIDDLES and Equipment are available to you in Foundry Supply houses everywhere. Full information will be sent at your request.

Extra Screens Save Money

Rims are made of heavy steel. Bottoms of extra heavy galvanized after woven wire cloth

TYPE CR—$260.00 COMPLETE
F.O.B. LEAVENWORTH

Great Western Manufacturing Company
LEAVENWORTH, KANSAS

(*Continued from page* 176)

ing coke (particularly its sulphur content), and specified maximum sulphur content of the iron in the finished castings.

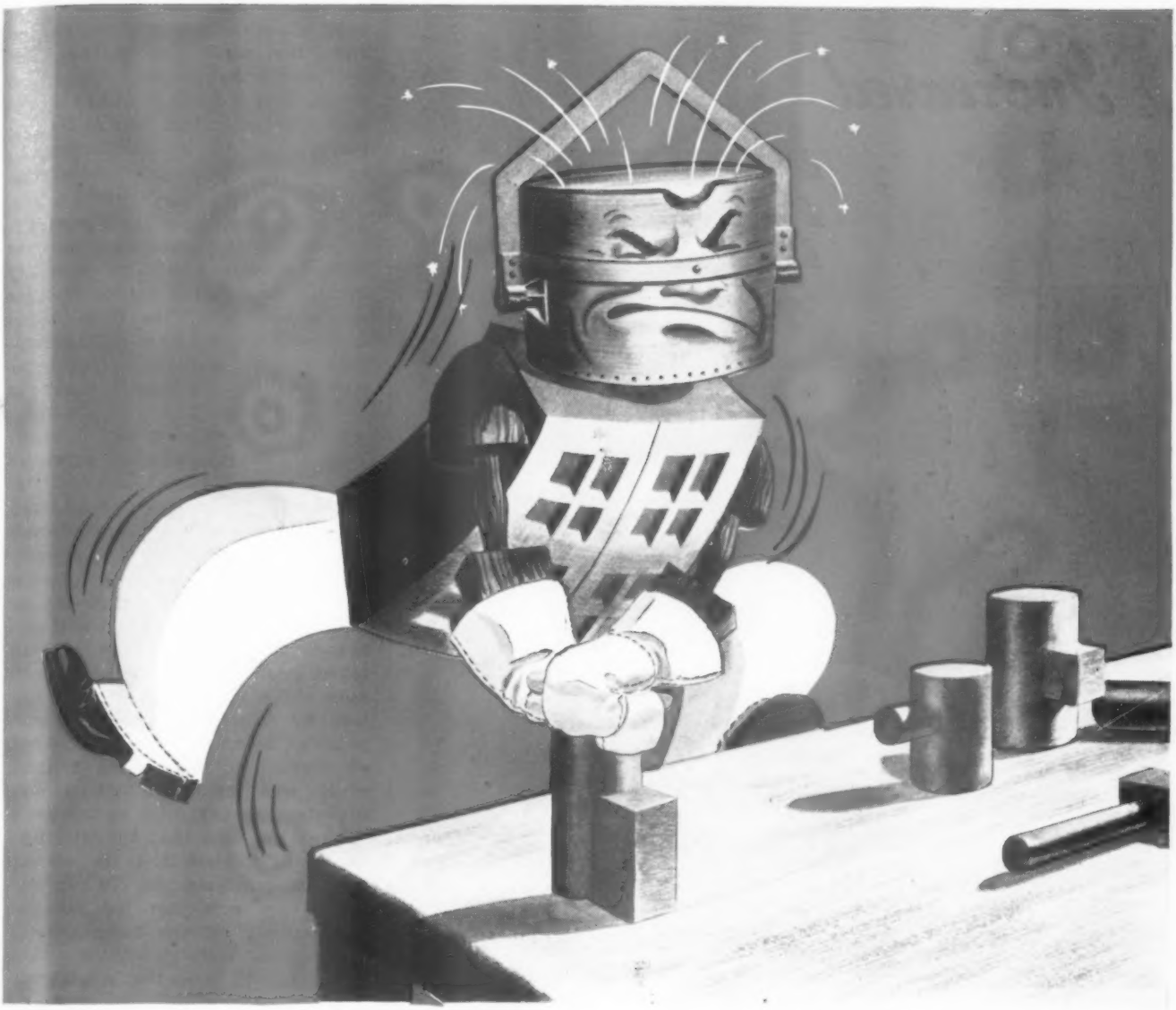
When stored in unheated buildings, fused soda ash will pick up some moisture from the atmosphere. Should this damp material be added to the bath of molten iron, it will result in excessive splashing and generation of sparks. This difficulty can easily be eliminated in any one of several ways. Where the operation requires a relatively small quantity of soda ash, a day's supply can sometimes be conveniently dried out by placing in a core oven. When this is not convenient, or when daily requirements are large, several hours' supply can be quickly dried with a torch flame. In other instances, a number of blocks may be placed over the cupola trough and dried by the heat radiated from the molten iron flowing beneath the blocks. With this arrangement, dried blocks are pushed off from the end of the cupola trough into the molten iron and are immediately replaced with damp blocks which dry out before the next addition is made. Where a covered stationary forehearth is used, blocks of soda ash can be dried conveniently by placing a number of them on the cover. These are replaced with damp blocks as the dried ones are used.

Add Soda Ash to Ladle

There are a number of other convenient methods of introducing the dried soda ash into the molten iron. When completely open or partially covered tilting teapot ladles are used, the soda ash can be added by hand, with a shovel, or by means of a chute consisting simply of a section of steel pipe split longitudinally. Legs made from any steel shapes available are welded to the chute in such a manner as to give it the proper slope. Blocks of soda ash are put into the chute near the top and fall by gravity into the pot of molten iron. This method is convenient especially where the cover opening is relatively small, as is quite often the case with covered U-shaped or cylindrical teapot ladles. When completely covered stationary forehearths are used, a hole is generally provided in the cover through which the soda ash may be added.

To obtain the greatest desulphurizing efficiency two things should be borne in mind when forehearth and teapot ladle equipment is designed and placed. First, the soda ash should be added to the molten bath at the

(*Continued on page* 180)



There's green strength for you

TRUSCOR (light weight) or AMERIKOR (heavy weight) Cereal Binder added to the core sand mix does a lot for core quality. It increases the affinity between individual sand grains before baking. This means greater green strength . . . more accurate cores.

The same qualities that bond sand grains together, prevent their adhering to the pattern, resulting in sharper — cleaner cores, thus better castings. Moreover, finely divided cereal binder adds a definite character to the mixture for a better surface finish.

Because cereal binder burns out rapidly and completely, there is easy and complete collapsibility.

For better, lower-cost cores, place a trial order for Krause Cereal Binders now — TRUSCOR, if you like a light weight binder; AMERIKOR, if you prefer a heavier weight.

CHAS. A. KRAUSE MILLING CO., MILWAUKEE 1, WIS.
World's Largest Millers of Dry Corn

Truscor AND **Amerikor**
(Light Weight) (Heavy Weight)

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Independent Foundry Supply Co., Los Angeles 11, Calif.
Joseph B. Meier, 96 N. 18th St., East Orange, N. J.
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Carl F. Miller & Co. Seattle 4, Wash.
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Pacific Graphite Works Oakland 8, Calif.
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Smith-Sharpe Co. Minneapolis 14, Minn.
Frederic B. Stevens, Inc. Buffalo 12, N. Y.
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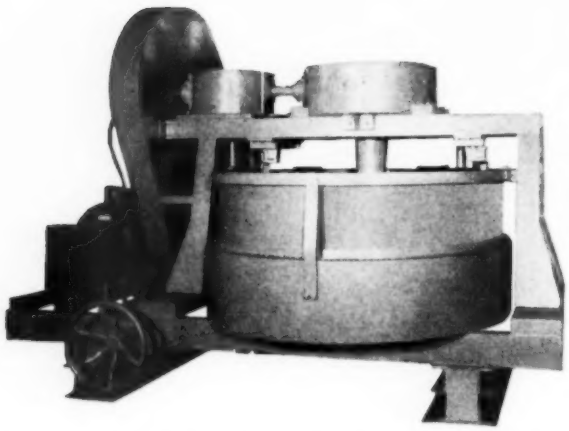
Increased **P**RODUCTION
PRECISION
PROFIT



"Lancaster's" New No. 4½ Heavy Duty . . . High Capacity . . . High Precision Mixer.

with the Scientific Lancaster Mixer

"Lancaster" Mixers are proving to be *profitable* equipment for the preparation of foundry sand formulas—core, facing or backing. Reasons? 3 of the most important are:

1. Increased Production. On installation after installation, the "Lancaster" has increased production because (a) the rapid, *complete* mixing provided by "Lancaster's" exclusive combination of counter-current mixing with balanced mulling results in higher output per hour . . . per man . . . per machine; (b) rapid charging, discharging and cleaning cuts time between batches; (c) dependably uniform mixing, batch after batch, promotes higher production efficiency.

2. Increased Precision: "Lancaster" Mixers for foundry installations are built for heavy duty, high capacity service . . . yet bring acknowledged machine-tool precision to the mixing art.

3. Increased Profits. Because of this combination of increased production with increased precision, the "Lancaster" Mixer broadens profit opportunities. In addition to the man-hours saved, costs are further reduced by (a) dependable batch control which saves valuable ingredients (b) minimized materials handling (c) elimination of adjustments and corrections caused by faulty batch preparation.

Details about "Lancaster's" 7 unit sizes and 27 models are furnished without obligation. Write today for free bulletins.

LANCASTER IRON WORKS, INC.
BRICK MACHINERY DIVISION
LANCASTER, PENNA., U. S. A.

(*Continued from page* 178)

point where the stream of molten iron from the cupola enters the ladle or forehearth. Second, the spent slag and refined iron should be drawn off (separately, of course) at the opposite end of the ladle or forehearth, or at a point as far from the stream of molten iron as practicable.

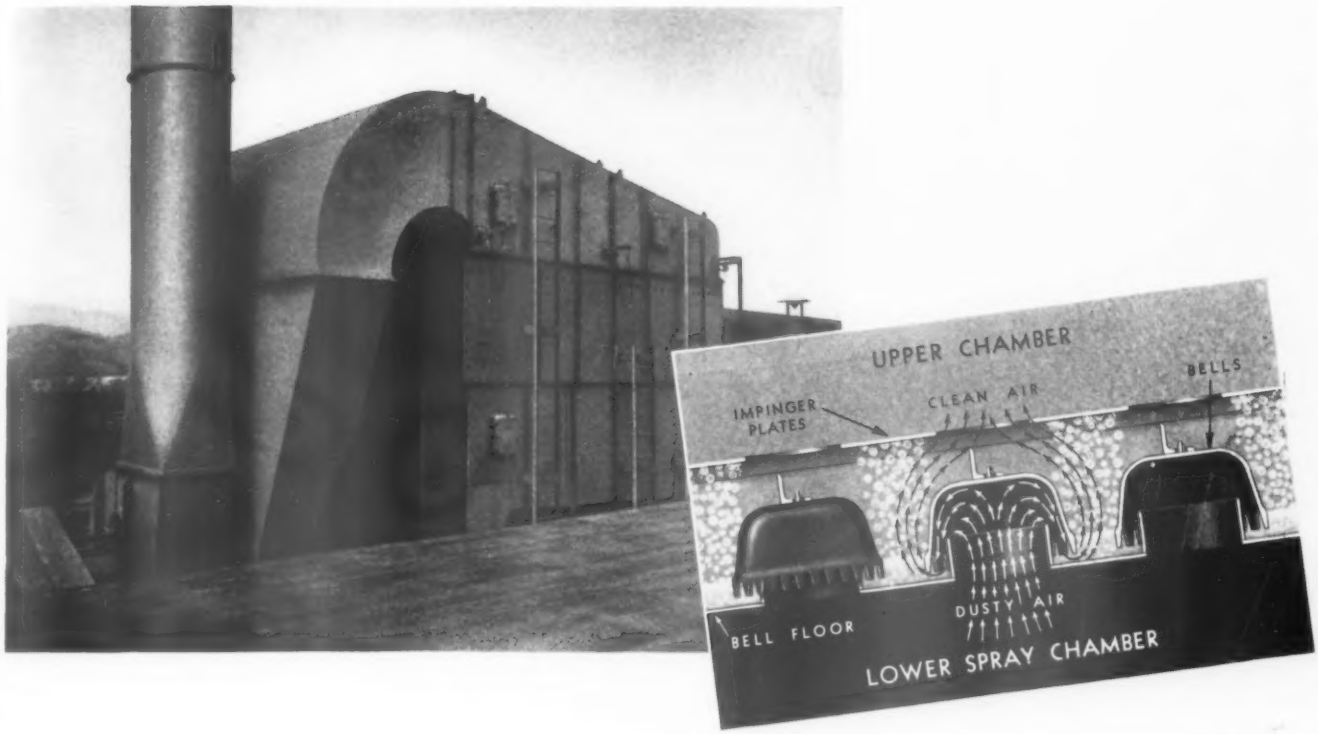
Desulphurization in the Forehearth—Desulphurizing procedure used in connection with a 72-in. cupola served by a 10-ton tilting teapot ladle is as follows. After the iron in the forehearth has attained a depth sufficient to seal or cover the hole leading from the forehearth proper to the teapot spout, a predetermined amount of fused soda ash is added. This amount is governed by experience and by the capacity of the forehearth, the object being to add a definite amount of fused soda ash per ton of molten iron.

When the forehearth is full, the iron is either tapped out or poured into a thoroughly dried and well preheated transfer ladle and is then taken to the pouring floor. Immediately after iron is poured into the transfer ladle, sufficient soda ash is added to the forehearth to treat an amount of iron equal to that which was removed. This is very important, as any delay at this point reduces the time that the iron running into forehearth is in contact with the purifying slag. When conditions are such that the ratio of the capacity of the forehearth to the cupola melting rate is small, any delay will mean that a relatively large percentage of the available contact time has been lost and consequently the efficiency of the desulphurizing equipment reduced.

Succeeding ladles of iron should not be taken out until the forehearth has been allowed to fill completely again. After several ladles have been taken out and a like number of additions of fused soda ash have been made to the forehearth, a layer of slag will have formed on the surface of the metal. This used slag should be skimmed off by allowing the level of the iron in the forehearth to rise to a point just below the slag spout so that the slag can flow out. It has been noted that more efficient desulphurizing is obtained when a thin layer of slag is allowed to remain on the surface of the iron.

This cycle of adding soda ash to the forehearth, allowing the forehearth to become completely filled, skimming off the slag and then pouring iron into the transfer ladle is continued throughout the duration of the day's cast. However, it is not

(*Continued on page* 182)



THE *Bell-Spray's* PROVEN DESIGN

Assures Inexpensive, Automatic Trouble-Free Operation

● Bartlett-Snow Bell-Spray Wet Dust Collectors incorporate in their design and operation all the foundry-proved advantages developed by Bartlett-Snow engineers since they pioneered in the wet dust collector field many years ago—and introduced the first commercially practical wet dust collector ever put on the market.

Dust laden air is drawn into the water spray or receiving chamber and thoroughly wetted, settling out the larger dust particles. The air then passes up through 3 inches of water on the bell floor—see diagram above—is thoroughly cleaned, and is drawn through moisture eliminator plates to the fan, which consequently handles only washed, clean air.

Installed as individual units or complete with collecting hoods. Let us work with you on your requirements!

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Bell-Spray

WET DUST COLLECTORS

1. Inexpensive to Operate.
2. Minimum of Maintenance.
3. Highly Efficient.
4. Handles Both Wet and Dry Air.
5. Safe for Hot Gases.
6. Easy Sludge Disposal.
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8. Sturdy, Serviceable Construction.
9. Three Different Types.
10. Wide Range of Standard Sizes.

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WET DUST COLLECTORS

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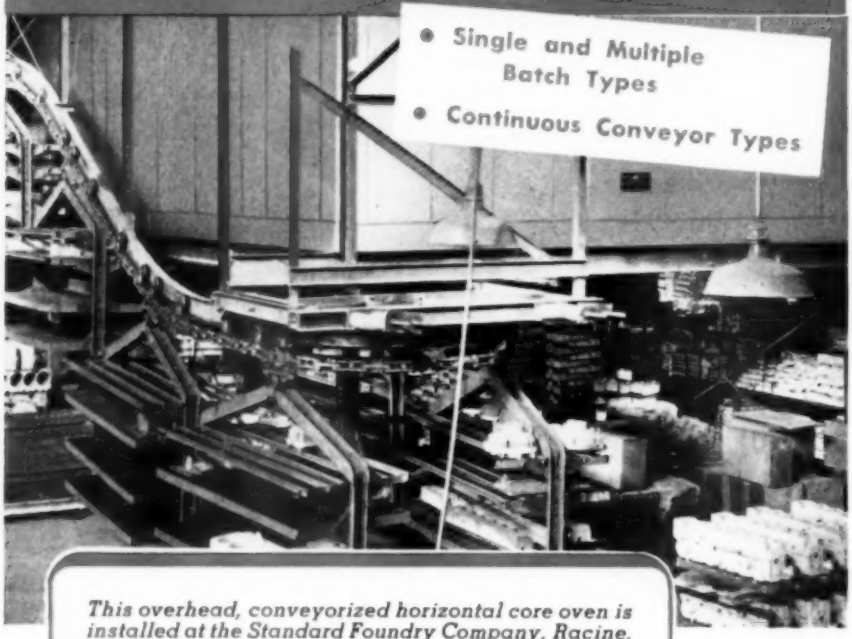
NEWCOMB-DETROIT
Core AND Mold Ovens



This overhead, conveyorized horizontal core oven is installed at the Standard Foundry Company, Racine, Wisconsin. It is equipped with racks and monorail conveyor. The work enters the oven from below at the far end. Direct fired gas pressure type burner with auxiliary equipment installed on the overhead platform at one end of the oven.

Although the design of the oven may vary to suit the individual applications, all Newcomb-Detroit Core and Mold Ovens embody carefully engineered principles of construction and heating. The following advanced features are in every installation . . .

- ✶ Convection heating provides controlled air circulation . . . faster baking.
- ✶ Automatic controls assure exact baking conditions . . . uniform results.
- ✶ Spill fan disposes of contaminated air . . . provides proper ventilation at all times.
- ✶ Engineered cooling zone cools cores to proper temperature before removal.
- ✶ No heat, smoke or acrid fumes escape to core room.
- ✶ Sturdy construction . . . built to withstand heavy usage on foundry operations.

SEND FOR BULLETIN ON CORE AND MOLD OVENS

Established 1912

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Grand Rapids Division
GRAND RAPIDS, MICH.

Main Office and Plant
5741 Russell Street
DETROIT 11, MICHIGAN

Western Sales Office
CHICAGO, Ill.

(*Continued from page* 180)

necessary to add soda ash for the last ladle or two, as the layer of refining slag already present will continue to desulphurize for at least 10 to 15 minutes.

Our metallurgical control consists of analysis of the iron from the teapot ladle for silicon and total carbon every 30 minutes, and determinations for sulphur, manganese and phosphorus each hour. In addition, we determine the amount of sulphur in the "base iron" (iron at the cupola spout before desulphurizing) every 2 hours. The results obtained in the laboratory are reported to the cupola foreman just as quickly as determinations are completed.

Soda Ash Produces Sulphur

The desulphurizing procedure just described is followed when iron is melted for super de Lavaud pipe, which at present is produced by this company in quantities exceeding the tonnage of all other castings combined. The cupola charge for this product is made up as follows: Cast scrap 2250 lb, pig iron 750 lb; 375 lb coke made up of 150 lb beehive coke, 150 lb by-product coke and 75 lb special coke.

The base iron before sulphur reduction contains an average of 0.136 per cent sulphur. After treatment with 5 lb of soda ash per ton, the iron contains an average of 0.081 per cent sulphur. Sulphur reduction, as will be shown later, is extremely important. However, it is only one of the significant items in connection with the figures just presented. Valuable by-products of sulphur reduction are cleansing and refining of the iron through removal of entrained silicates with a resultant improvement in fluidity, amounting in some cases to an increase of 33 per cent. Federal specifications covering super de Lavaud pipe state that the iron used shall not contain sulphur in excess of 0.10 per cent. Use of fused soda ash brings the composition of the iron within this specified range.

From time to time we are obliged to use as a part of our cupola charge a type of coke excessively high in sulphur content. Through careful laboratory control the cupola foreman is kept posted on any change or trend in sulphur content of the base iron. On one occasion, when a beehive coke containing 2.06 per cent sulphur was used for melting, the base iron was found to contain 0.166 per cent sulphur. In order to reduce this to an average of 0.087 per cent, it was necessary to use 8 lb of soda ash per ton of iron. This is men-

(*Continued on page* 184)

FABREEKA

UNDER SHAKEOUT MACHINES JOLT MOULDERS AND OTHER HEAVY MACHINERY

FABREEKA has demonstrated its ability to increase production efficiency and reduce the costs of maintenance by absorbing the effects of heavy impact shock and destructive vibration under such heavy machinery as shakeout machines, jolt moulders, forging hammers, grinders, stamping machines and many others.

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HOW TO BEAT NEXT SUMMER'S HEAT NOW!

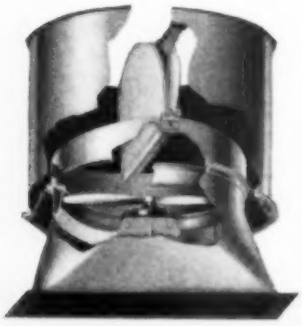
PROPELLAIR VERTI-STACKS!

Lehigh Foundries, Inc., Easton, Pa., keep the air clear all year round with fifteen Verti-Stacks. On new roofs or old, Verti-Stacks are the quick, easy way to cleaner working conditions.

Foundries equipped with Propellair Verti-Stacks are well acquainted with good ventilation. For they know how Verti-Stacks clear out dust and smoke . . . shoot them high into the outside air . . . keep the inside atmosphere *good for working.* And with summer's heat coming up, they're all set—for Verti-Stacks give *high-volume air movement* to improve daytime comfort; and at night they sweep the entire building with cool, *fresh* air—leave it *right* for the day shift. Propellairs play *a big part* in bringing about better working conditions, happier employees, less labor turnover, *more* and *better* production.

EASY TO INSTALL — INEXPENSIVE TO USE

Verti-Stacks take up no foundry space, are easy to install, require negligible maintenance. Powerful suction of Propellair *double-action* airfoil fan blades—plus the airfoil-principle entrance ring that prevents recirculation—*plus* the fact that there is nothing inside the stack to restrict free airflow—all add up to *efficient* performance and *low* operating costs. Prepare for summer's heat *now.* Write for full details.



PROPELLAIR

VERTI·STACK

POWER ROOF VENTILATOR

Propellairs are also made for walls, windows, ducts, and with pedestals or stands. Sizes for all needs.

PROPELLAIR

DIVISION OF ROBBINS & MYERS · INC.

SPRINGFIELD · OHIO

(*Continued from page* 182)

tioned simply to point out that with soda ash high-sulphur cokes can sometimes be used successfully, *provided* the cupola operator is ingenious enough to cope with some of the operating difficulties which generally accompany the use of poor quality coke.

In the manufacture of chilled cast iron plow shares, our experience indicates that one of the factors important in the elimination of cracks along the chilled edge (resulting in production of scrap castings) is the reduction of sulphur content to about 0.075 to 0.090 per cent. Actual examples of suphur reduction taken from our laboratory records show that the base iron contains an average of 0.139 per cent sulphur. The addition of 12 lb of soda ash per ton of molten iron reduced this to 0.080 per cent. It is interesting to note that this reduction required only 4 minutes and 10 seconds, by stop-watch timing.

Another example of a high order of sulphur reduction in connection with the manufacture of quality castings for the chemical industry is presented in connection with the following cupola charge:

	Per Cent	Pounds
Pig iron	15.0	300
Automotive cast scrap	60.0	1200
Steel scrap	22.5	450
Spiegeleisen	1.5	30
Lump ferro-silicon (50% Si)	1.0	20
Total	100.0	2000

The above mixture resulted in the production at the cupola spout of an iron containing 0.099 per cent sulphur. After treatment with 5 lb of soda ash per ton of molten iron the sulphur was reduced to 0.051 per cent. The reader may well ask, "Why should the sulphur be reduced to this relatively low level?" The reason is simply because the customer specified 0.07 per cent maximum sulphur content in the iron used for his castings.

Many factors influence the desulphurization of cast iron. These will not be taken up here as they have been discussed by the writer in an article entitled "Desulphurizing Cupola Cast Iron From the Practical Operating Angle," which appears in AFA *Transactions*, Volume 48 (1940). At one time it was felt by many cupola operators that teapot ladles and forehearths could be used only in foundries producing large heavy castings where high pouring temperatures were not essential. This notion need no longer be the reason for

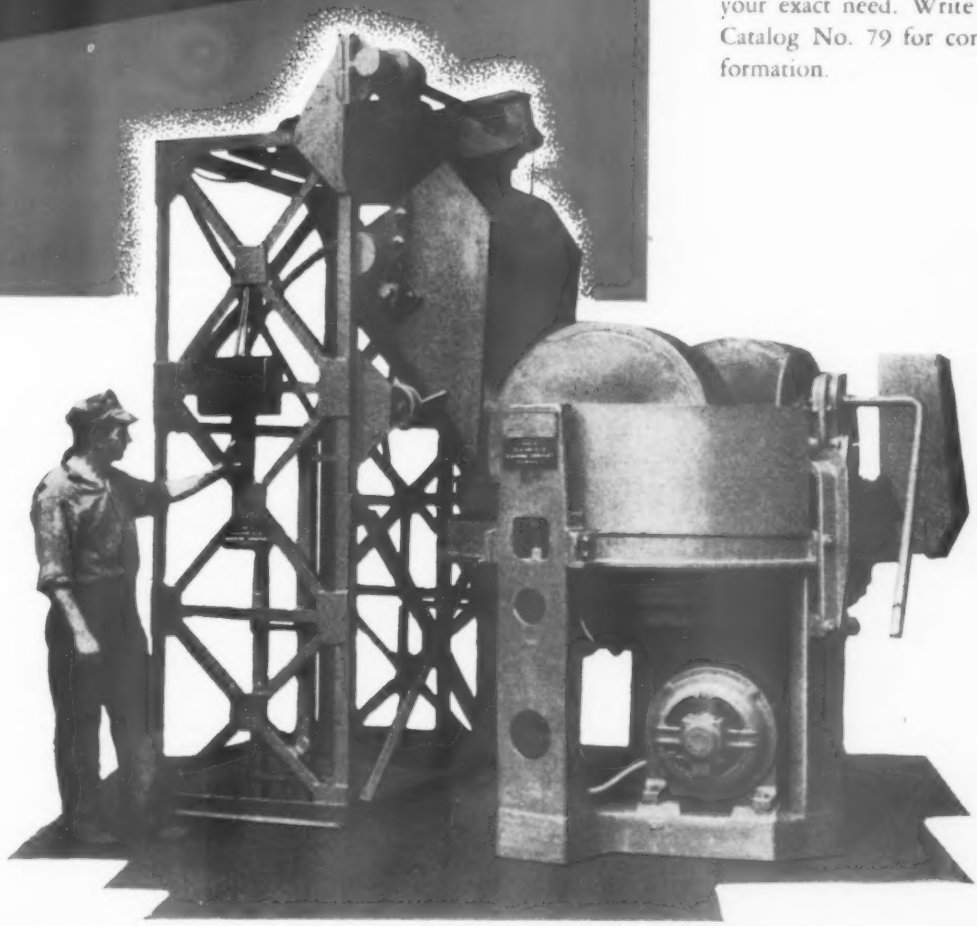
(*Concluded on page* 186)

consistent sand quality
with an
automatically controlled

CLEARFIELD
MIXER

For operations which require the utmost consistency in sand quality, an automatically controlled Clearfield Mixer is the ideal solution. Any Clearfield Mixer can be made wholly or partly automatic, giving you a predetermined and uniform preparation procedure.

There's a Clearfield Mixer to suit your exact need. Write today for Catalog No. 79 for complete information.



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MIXES, TEMPERS
AERATES

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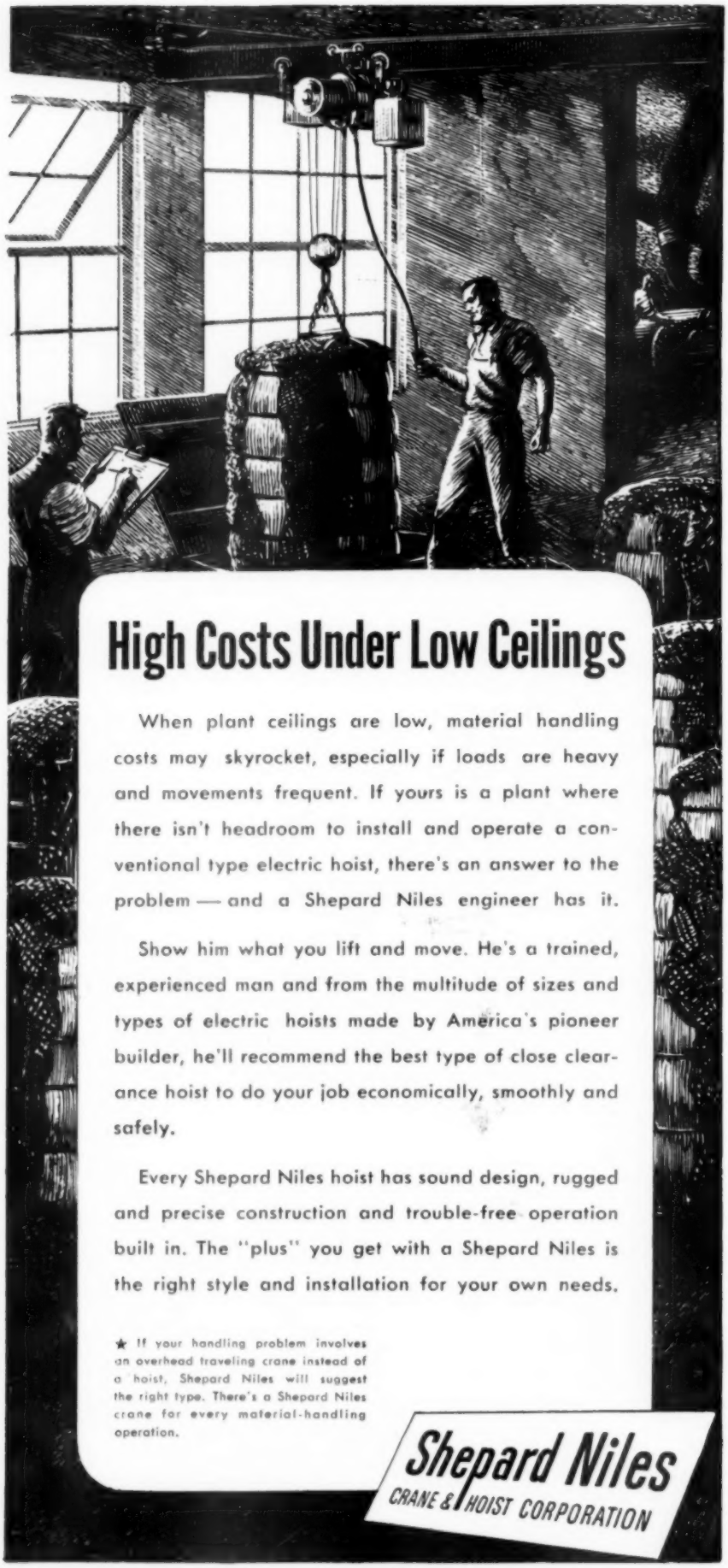

High Costs Under Low Ceilings
When plant ceilings are low, material handling costs may skyrocket, especially if loads are heavy and movements frequent. If yours is a plant where there isn't headroom to install and operate a conventional type electric hoist, there's an answer to the problem — and a Shepard Niles engineer has it.
Show him what you lift and move. He's a trained, experienced man and from the multitude of sizes and types of electric hoists made by America's pioneer builder, he'll recommend the best type of close clearance hoist to do your job economically, smoothly and safely.
Every Shepard Niles hoist has sound design, rugged and precise construction and trouble-free operation built in. The "plus" you get with a Shepard Niles is the right style and installation for your own needs.
★ If your handling problem involves an overhead traveling crane instead of a hoist, Shepard Niles will suggest the right type. There's a Shepard Niles crane for every material-handling operation.
Shepard Niles
CRANE & HOIST CORPORATION
360 SCHUYLER AVE. • MONTOUR FALLS, N. Y.

(*Concluded from page* 184)

failure to take advantage of the benefits of sulphur reduction, because, with a little careful thought in the selection and design of equipment and judicious use of insulating refractories, the operation can be made to succeed. In the foundries of this company, castings are produced ranging in weight from less than 5 lb each to nearly 50 tons. The iron for all of them is treated with soda ash for the purpose of sulphur reduction and the attendant benefits.

STEEL FOUNDERS' SOCIETY HOLDS ANNUAL MEETING

(*Continued from page* 81)

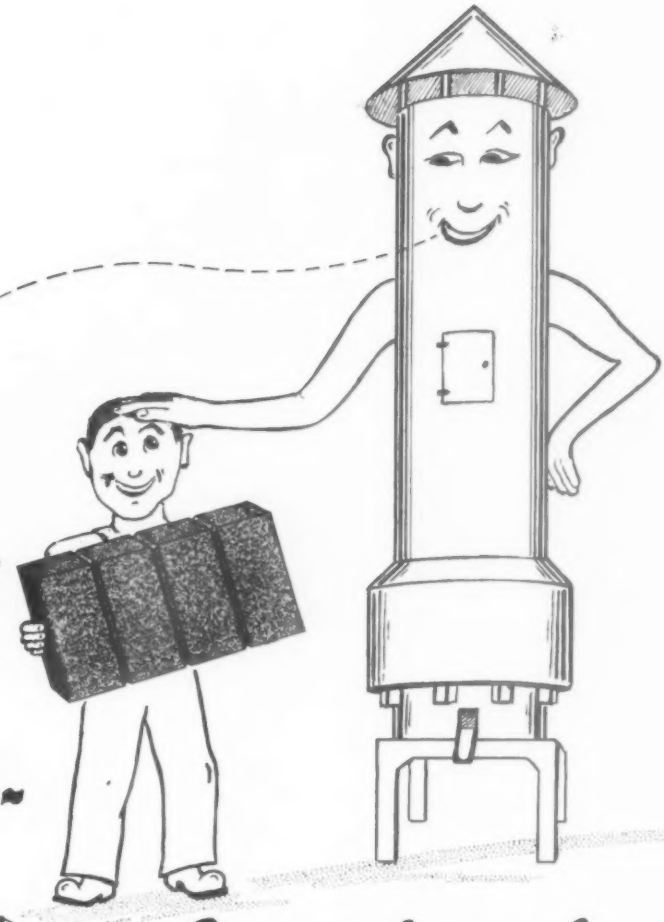
1 year, General Railway Signal Co., Rochester, N. Y., and Mackintosh-Hemphill Co., Midland, Pa. The following foundries had a cumulative lost-time injury frequency rate of less than 10: Steel Foundry, Bethlehem Steel Co., Bethlehem, Pa., 1.1; Steel Foundry, Carnegie-Illinois Steel Co., Lorain Division, Johnstown, Pa., 1.4; General Steel Castings Corp., Eddystone, Pa., 4.2; Steel Foundry, General Electric Co., Everett, Mass., 4.7; Chapman Valve Mfg. Co., Indian Orchard, Mass., 5.6; Steel Foundry, Bethlehem Steel Co., Steelton, Pa., 6.5; General Steel Castings Corp., Granite City, Ill., 7.3; Hughes Tool Co., Houston, Tex., 7.5; and Symington-Gould Corp., Depew, N. Y., 7.8.

The Lorenz Medal of the society was presented to E. D. Flintermann, president, Michigan Steel Casting Co., Detroit, and immediate past president of the society for his contributions to the society and the progress of the steel castings industry.

The Technical & Operating Medal of the society was awarded to Charles L. Heater, vice president, American Steel Foundries, Chicago, and chairman of the technical research committee of the society for his contributions to the technical and operating work of the Steel Founders' Society. Because Mr. Heater was on the West coast on vacation, the medal was accepted in his behalf by James Suttie, vice president of the American Steel Foundries.

Philip S. Hanna, financial columnist, *Chicago Daily News,* Chicago, gave a thought-provoking address entitled "Is the U. S. Going to Hell?" After pointing out many of the things that both government and business are doing wrong, Mr. Hanna came to the conclusion that this

(*Continued on page* 188)



"Thanks my Friend--

because of you, I produce clean metal and give castings a better start."

Famous CORNELL CUPOLA FLUX

SCORED BRICK FORM makes cost of fluxing metal amazingly low.

No digging out of container. No weighing. No measuring. Under average conditions, you simply toss one brick into cupola for each ton charge of iron or break off a briquette (quarter section) for each 500 lb. charge. Unlike flux in other forms, it does not blow out with the blast but stays in melting zone until entirely consumed, thus insuring fullest efficiency.

If your cupolas were human, they would "pat you on the back" for your foresight in using Famous Cornell Cupola Flux. *Both molten metal and cupola operation are definitely improved.*

Famous Cornell Cupola Flux cleanses molten metal, thereby giving you sounder, stronger metal structure for your castings. Chilled sides, hollow centers, etc. are greatly reduced. Machining is easier and smoother. There are fewer rejects and make-overs.

Famous Cornell Cupola Flux preserves the life of cupola lining and makes for cleaner cupolas and cleaner drops. Bridging over is reduced to a great extent. Maintenance cost is practically nil, by comparison.

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Produces clean, tough castings. No spongy or porous spots even when more scrap is used. Thinner yet stronger sections are poured. Castings take a higher polish. NO FUMES! Exclusive formula prevents obnoxious gases. Metal does not cling to dross.

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Makes metal pure and clean, even when dirtiest brass turnings or sweepings are used. Produces castings which withstand high pressure tests and take a beautiful finish. Saves considerable tin and other expensive metals. Crucible and furnace linings are preserved.

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Place a few ounces in bottom of ladle, then tap cupola. Metal is thoroughly cleansed, foreign impurities are easily skimmed off. Ladles are kept clean, there is less patching and increased ladle life. Metal temperatures are retained during transfer to molds.

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The check list (at right) indicates some of the many compressed air jobs to be done, all of which are accomplished easily, quickly and economically with Schramm Air Compressors.

Here's *why* you profit, as others have, by using Schramm: they're compact, lightweight, easy to start; built for rugged jobs, to provide a continuous flow of air.

Important features include 100% water cooled; mechanical intake valve; forced feed lubrication and easy starting.

Performance everywhere has proved Schramm Air Compressors can do any compressed air job you require. Write today for list of models and sizes.

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- Cleaning Engine Generators
- Operating Air Hoists

SCHRAMM INC.

THE COMPRESSOR PEOPLE • WEST CHESTER • PENNSYLVANIA

(*Continued from page* 186)

country is not going to hell, but is only going through hell, and that in the long run this will keep our nation healthy. Mr. Hanna stressed the point that business would need adequate reserves in the days ahead. We need some word from government that thrift and the protection of our credit is important. Mr. Hanna believes that the future is going to be better, but he indicated his inability to sell a real convincing bill of goods on the reasons why.

Not Enough Scrap

Edwin C. Barringer, executive vice president, Institute of Scrap Iron and Steel, Washington, presented an interesting discussion of "The Problems of the Scrap Market." Mr. Barringer indicated that in a very real sense there is no shortage of scrap, when the steel industry is able to operate week after week at 95 per cent and higher. The fact is that despite the availability of record breaking tonnages, as indicated by steel industry operations, there is still not enough scrap to go around. And there is substantial reason for believing that the iron and steel industry will go through the greater part of 1948 at or near capacity, notwithstanding the recent shakeout in commodity and stock markets.

Mr. Barringer reviewed such strictly dealer sources of scrap as shipbreaking, auto wrecking yards, farms, obsolete equipment, government surplus and overseas scrap. With the exception of shipbreaking, increases in varying amounts may be anticipated from these sources.

He pointed out that dealers supplying steel foundries have been severely handicapped by two developments. Steel mills have been exacting the return of scrap from buyers of their products, a practice which is understandable at present but which is not economical or to the best interests of mills, other consumers of scrap and scrap dealers. This earmarking of scrap severely restricts the supply of raw materials flowing to scrap yards for preparation. While the Joint Committee for Expediting Scrap in 1948 succeeded in securing an appropriation from Congress of $25 million for the Army out of receipts of the sale of scrap to cover collection, preparation and transportation of army scrap, the Army feels that it cannot safely unload more than 200,000 tons of its reserves of ammunition, reducing the potential scrap from that source from upward of 200,000 tons to about 60,000 tons in the first half of 1948.

(*Continued on page* 190)

ROBINSON

CAS-TO-FIT
CASTABLE REFRACTORY

FLINT-CAST
SUPER-DUTY CASTABLE

ELIMINATE REPAIR DELAYS!

Mold special shapes right in your own plant. No costly waiting for special shapes to be made and delivered! Burner blocks, door tile, dampers, baffle tile — any special refractory shape quickly and easily formed with Robinson Castables! Robinson Castable Refractories are ideal for all types of furnace repairs — they're easily mixed to any convenient consistency for ramming, lining small furnaces, forming hearths for domestic stokers, oil burner work, or for pouring into forms, as is necessary in different types of baffle work.

Hydraulically setting, Robinson Castable Refractories do not require the application of heat to set. Extremely high working ranges (3,000° F. for Flint-Cast, 2,650° F. for Cas-To-Fit) insure longer furnace life with more heats. Carefully compounded formulae with calcined bases give Flint-Cast and Cas-To-Fit unusual strength and hardness under the most severe furnace conditions. High resistance to flash temperatures and sudden changes in temperature mean longer service — less downtime — more production!

Manufactured and shipped in dry form in moisture-proof sacks, Robinson Castables eliminate the danger of "setting up" in the containers. This convenient form also allows mixing of Flint-Cast and Cas-To-Fit to the desired consistency for your own particular application, whether it be pouring, moulding, or ramming.

R-248-7

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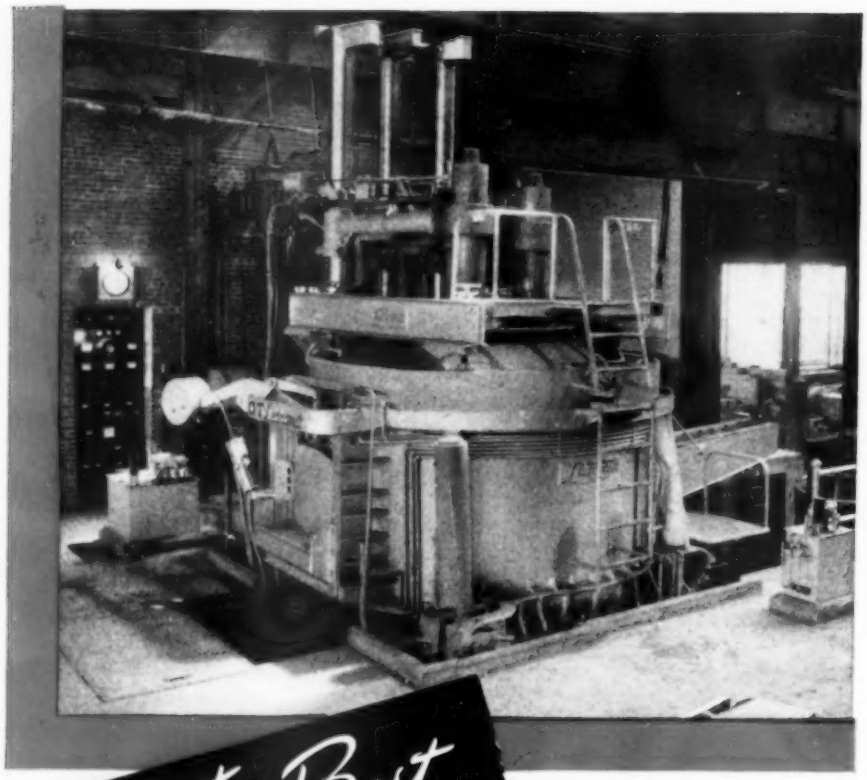

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PITTSBURGH 30, PA.

(*Continued from page* 188)

Mr. Barringer stated that undoubtedly there will be no exports of scrap under the Marshall plan, since European countries are much better off with regard to scrap than we are in this country.

Jack Claussen, American Iron & Steel Institute, New York, followed with a discussion on the "Pig Iron Supply Problem." Considering primarily the steel foundry industry, Mr. Claussen indicated that the heavy demand for gray iron and malleable iron castings following the war resulted in an increase in production of foundry and malleable grades by merchant furnaces and a consequent decline in steelmaking grades. This was accelerated by allocations for the housing program. However, a considerable percentage of basic, bessemer and low phosphorus pig iron used by steel foundries is made by integrated steel companies for their own use and for sale, and as a result, tonnages of steelmaking grades for sale also have shown increases. The speaker stressed the point that increases in pig iron production have been made available in the face of serious handicaps, including a drop in production ranging from 0.04 to 0.33 net tons per sq ft of hearth area, due to poor quality of coking coal, scarcity and poor quality of scrap of the blast furnace grade, and difficulties in quality of iron ore.

Production depends on Conditions

Mr. Claussen stated that production of pig iron in 1948 will depend on several conditions, including freedom from labor difficulties and adequate supplies of good quality of raw materials. Blast furnace capacity is being increased steadily, but an early opening of lake transportation and a considerably heavier movement of ore than in 1947 will be necessary if all old and new furnaces are to receive sufficient ore. Relining and repair of furnaces, which have been driven to the utmost, will take some capacity out of production during the year.

In conclusion, Mr. Claussen pointed out that as yet voluntary allocations provide an unknown factor. While the foundry has a fair indication of the difficulties which may be encountered through government allocation, the final result cannot be known. Favored industries are likely to pass demands for larger supplies of pig iron, partly due to stepping up production and partly due to the probability that these industries will endeavor to increase their percentage of pig iron in the mixture

(*Continued on page* 192)

One "First"

Black Hills Bentonite tops all other types of bond clays in resilience. This toughness avoids trouble with difficult lifts. Molds break less at corners and edges. Rattails and buckles are reduced to a minimum.

Another "First"

You get higher dry strength than with any other clay —ideal for heavy green sand or medium weight dry sand work. Here is real insurance against cuts and washes, especially in steel foundry practise.

Still Another "First"

No other bond clay or combination of clays can equal Black Hills Bentonite in its combination of high hot strength and high permeability.

Also...

Very high green strength, which cuts amount used and leaves less dead clay in your sand. High permeability, which affords protection against blows, and improves castings' finish.

EASTERN CLAY PRODUCTS, INC.

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And Remember: Only from ECP can you obtain five distinct types of bonding clays, which, with numerous combinations, meet foundry requirements ***exactly:*** Black Hills Bentonite, Dixie Bond, Revivo Bond, Revivo Super Bond, Balanced Revivo.

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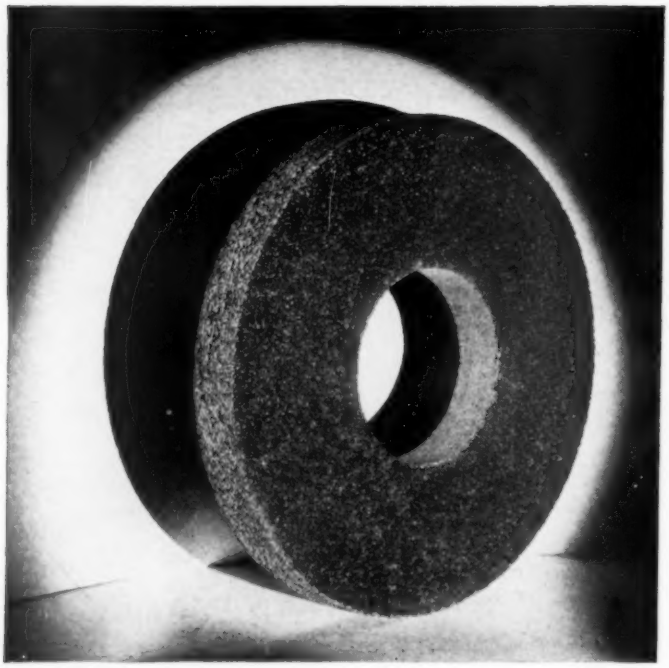

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MANHATTAN ***Snagging Wheels for Stand Grinders Swing Frame Grinders***

Incentive systems require that the tools put into the hands of the worker be engineered more closely than ever before. Operators want fast, free cutting Grinding Wheels. Management is desirous of giving them what they want, but must also keep constant vigilance over total costs. In this respect the competent services of Manhattan's Field Engineers will ably assist you in the controlling of these vital details.

Manhattan Snagging Wheels consistently show increased production at no extra cost.

ABRASIVE WHEEL DEPARTMENT

RAYBESTOS-MANHATTAN INC.

Keep Ahead with Manhattan

MANHATTAN RUBBER DIVISION **PASSAIC, NEW JERSEY**

(*Continued from page* 190)

as long as scrap continues in short supply and at prices above those of pig iron.

On Thursday morning, George B. Christensen, Winston, Strawn & Shaw, Chicago, discussed "Labor's 1948 Position in the Light of the Taft-Hartley Act." Mr. Christensen traced the various events that affected the balance between labor and management, and outlined the provisions of the Taft-Hartley Act. He indicated that the unions cannot possibly convince the Congress that the Taft-Hartley Act is all bad, and that they will not be able to make any substantial inroad on the act in 1948.

New SFSA President

F. KERMIT DONALDSON, newly elected president of the Steel Founders' Society of America, has been vice president and general manager of the Machine Steel Casting Co., Alliance, O., since 1941. Born and educated in Alliance, Mr. Donaldson studied chemistry and metallurgy at night school and by correspondence. He entered the Alliance plant of American Steel Foundries, Chicago, in 1916. When Machined Steel Casting Co. was organized in 1919, he became associated with the company, subsequently serving as draftsman, chemist, inspector, assistant sales manager and general superintendent. He served as a director of the Steel Founders' Society from 1940-44.

At the same time, management will not be able to strengthen the law. Nevertheless, unions will continue to hammer at its provisions, and at the same time management must continue to press for certain provisions.

Mr. Christensen stressed the point that management must do all it can to educate its employees on the provisions of the Taft-Hartley law. He pointed out that employees never will learn the truth of the law from the labor leaders. He criticized contracts which exempted unions from damage suits, since these are contrary to public policy and do not represent sound company business.

H. J. Post, executive vice president, National Association of Personnel Directors, Chicago, gave an inspirational and instructive talk on "What

Your Foreman Wants From You." Mr. Post outlined some of the gripes of foremen and explained how they result in difficulties for top management. He pointed out that while 95 per cent of all grievances of labor are directed against the company as a whole, 95 per cent of the grievances of foremen are of a personal nature. Most of these are the result of a clash of personalities where something is done which builds a wall between the foreman and one or more individuals.

Foremen Are Loyal

The extensive experience of Mr. Post indicates that foremen are definitely loyal to the company. But foremen must feel that they are a part of management. If this feeling exists, there can be no difficulty but if it does not exist, trouble will follow. Mr. Post stated that foremen want to have an interpretation of company policy. They want to know executive management and they want to be kept informed of what is going on. Compensation of foremen should be consistent with their ability and there should be a chance for promotion. The foreman should be given educational help, his superiors should talk with him and not to him, he should receive recognition for a job well done and should have a sense of belonging. The speaker concluded with the suggestion that instead of working on the actions of people it might be well to work upon their thinking.

Chauncey Belknap, counsel for the Steel Founders' Society of America, discussed several of the problems facing the industry.

At the noon program, Pat Nagel, membership counselor, Employers Association of Chicago, presented two sound films under the title "Propaganda—Pro and Con."

The first general session was devoted to reports of officers and committees, with F. Kermit Donaldson presiding. Leslie C. Thellemann, executive vice president, gave an overall picture of the society's program and various activities, including the industry meetings and committee work.

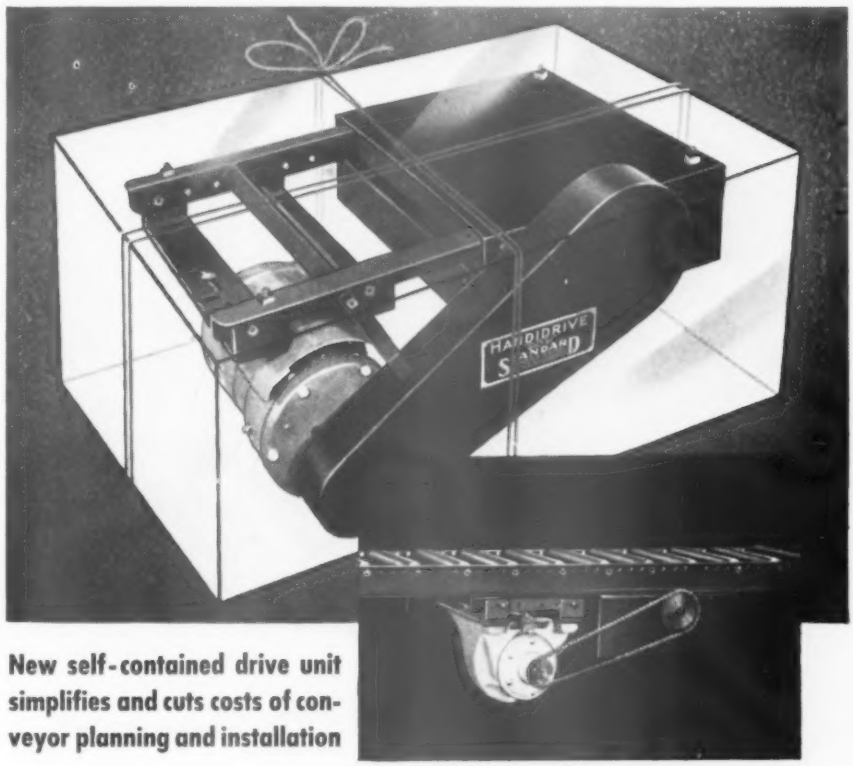
Charles W. Briggs, technical and research director, gave a detailed report covering the technical and operating groups, the publication "Steel Foundry Facts," research activities and the work of the safety committees. He indicated that the T & O groups held 67 committee meetings culminating in a conference last June in Cleveland. The next T & O conference will be held in Cleveland

(*Concluded on page* 196)

Announcing the new Standard

HANDI-DRIVE

. . a "power package" unit for all types of roller and belt conveyors



New self-contained drive unit simplifies and cuts costs of conveyor planning and installation

Here it is! A packaged power unit that gives every conveyor user the opportunity to be his own layout engineer — to change his conveyor system to suit varying plant conditions in a minimum of time!

Converts gravity conveyors to live belt or roller conveyor quickly . . at low cost

The Handi-Drive is a self-contained drive unit for applying tractive power to gravity conveyor belt or rollers. Equally important, using standard units you can build a conveyor system custom-planned to your individual plant needs. Standard units are stocked at the factory — you can get them now!

If you want to convert your present gravity conveyors to powered units — or if you want to install your own new system . . . send for the Handi-Drive Bulletin No. F-48. It gives you complete design information and prices — tells you how to lay out your system, gives complete data on inclines, belt and roller widths, curves, weights to be handled and types of packaging or units to be moved. Write: Standard Conveyor Company, North St. Paul, Minnesota.

See our Exhibit, A.F.A. Exposition, Philadelphia — Booths 708 and 710

Standard
GRAVITY & POWER
CONVEYORS

Your Sand...

is it thoroughly mulled?

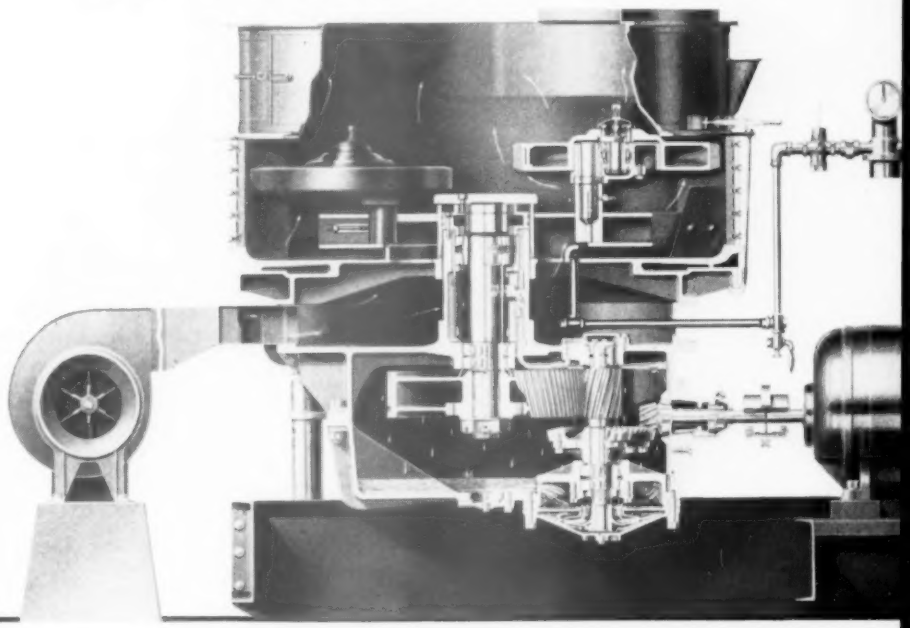
what length of time is required in its preparation?

is it cooled?

1. The Speedmullor *mulls* sand—not merely mixes. The positive turning of the rubber-tired mulling wheels, the application of uniform pressure on the sand between the wheels and rubber-lined side-wall, and the rapid agitation which keeps the entire batch of sand constantly in motion, *assure* the most complete and thorough distribution of all water and bonding materials.

2. The Speedmullor mulls sand 4½ times as fast as any sand mixing unit. It thoroughly mulls all types of sand, even sand containing the highest bond or oil additions in 1 to 1½ minute cycles. Speedmullor mulled sand requires no further aeration and is absolutely uniform in quality and texture.

THE SPEEDMULLOR



Cross section view of the Speedmullor with air cooling. The arrows indicate how the cool air is forced up through the sand, cooling it to within 10 degrees of room temperature—as it mulls—all in a 1½ minute cycle.

3. Many foundries are now using Speedmullor cooled sand! The *exclusive* design of the Speedmullor permits the passage of air through the entire batch of sand as it is mulled. *Only in the Speedmullor* can efficient cooling be accomplished. So put hot sand into the Speedmullor—it will mull, cool and aerate the entire batch—all in the same cycle.

The exclusive design and features of the Speedmullor assure (1) fastest mulling, (2) thorough mulling, (3) most efficient cooling, (4) maximum uniformity, (5) highest unit capacity.

Speedmullors are furnished with or without skip hoist; air cooling; fines removal. For the ultimate in production and efficiency, Speedmullors are equipped for completely automatic operation—loading, mulling, fines removal, cooling and discharging. There are six sizes of Speedmullors to meet the exact requirements of every foundry—large, medium and small.

SEE THE SPEEDMULLOR IN OPERATION

See the Speedmullor in action—mull, cool and remove fines. We will make complete arrangements in a foundry near to you. Write today!

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Western Metal Abrasives Co. is now in operation producing "Controlled" shot and grit by the same process employed by the makers of National "Controlled"—the shot and grit long favored by industry for its uniformity, fast cleaning, long lasting qualities. It's a fact—*"Controlled" grit cleans faster because its chunky, solid, sharp-edged bodies hit harder!*

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(*Concluded from page* 193)

June 3-5, 1948. He stated that thirteen research projects were active, that five research reports were reported during the year and that it is hoped that six reports will be ready during the present year.

The following committee reports were presented: Advertising, by W. F. Wilson, Lebanon Steel Foundry, Lebanon, Pa.; Definitions and Classifications, by A. M. Andorn, Penn Steel Castings Co., Chester, Pa.; Education, by J. A. Sauer, Symington-Gould Corp., Rochester, N. Y.; Personnel, by J. E. Turner, General Steel Castings Corp., Eddystone, Pa.; Research Fund, by G. R. Casey, Treadwell Engineering Co., Easton, Pa.; Sales Manual, by F. H. Bonnet, Buckeye Steel Castings Co., Columbus, O.; Specifications, by W. W. Heimberger, Buckeye Steel Castings Co., Columbus, O.; Technical and Operating, by J. F. Lacey, Commercial Steel Castings Co., Marion, O.; Statistical Reports, by Leslie C. Thellemann; Safety and Technical Research, by Charles W. Briggs.

ALUMINUM ALLOY CASTINGS

(*Continued from page* 85)

from furnace to ladle, or from ladle to ladle, the metal stream should be kept as short as possible and the operation completed without interruption. As during other stages of the foundry procedure, agitation of the metal should be held to a minimum. When the metal is poured into the mold, the ladle should be held as close to the sprue as possible, as too great a pouring height often results in dross and trapped air in the casting, as well as increased gas porosity because of the greater exposure of the molten metal to the atmosphere. The metal should enter the sprue without splashing or violent agitation, and the stream should not be broken at any time during the pouring operation.

Care of Melting Equipment — As the composition of aluminum alloys must be carefully maintained in order to obtain uniform physical and mechanical properties in the completed castings, suitable precautions must be exercised in all foundry operations to keep contamination at a minimum. This requires that pots, crucibles, ladles and all other equipment that comes in contact with the molten metal be kept clean at all times. This is particularly important when switching from one alloy to another of different composition.

Melting pots and ladles must be thoroughly scraped to remove any loosely adhering scale that might work off into the metal. Iron pots and all other iron equipment coming into contact with the molten metal must be kept thoroughly coated at all times to prevent iron pickup by the metal. Whiting or one of the commercially available preparations for this purpose may be used, a mixture of 7 lb to a gallon of water providing a consistency convenient for application by brushing. The parts to be coated are heated to a temperature near the boiling point of water and the mixture is brushed on. Before use, newly coated equipment should be preheated to drive off any remaining moisture.

Conclusion—The adoption and consistent following of careful melting and pouring procedures are necessary if castings of uniformly good quality are to be produced. Care to avoid excessive contact with combustion gases, the atmosphere, and moisture in any form, and handling procedures to avoid excessive agitation of the melt will minimize gas absorption and oxidation difficulties. Proper fluxing will remove most of the gas and oxidation that are unavoidably introduced. Cleanliness and proper handling of scrap will keep chemical contamination to a minimum. And good temperature control equipment will pay for itself many times over in castings and time saved.

The importance of adequate equipment of proper design and construction cannot be overemphasized. Purchasers of castings should assure themselves that foundries from whom they buy are equipped to meet their needs efficiently and dependably.

Future articles in this series will cover other phases of the aluminum alloy casting art—permanent mold practice, casting design, trimming and finishing, heat treatment, inspection and quality control.

Book Aids Designers

Bulletin, "Formulas for Computing Maximum Stresses and Deflection in Circular Flat Plates," is part of a long range research program aimed toward the development of material to aid machine and structural designers and was published by Meehanite Metal Corp., Pershing Square Bldg., New Rochelle, N. Y.

The book contains 18 pages of tables, charts and formulas evolved and simplified for direct application to constructions utilizing the characteristics of Meehanite castings.

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CONDITION YOUR SAND IN THE MOST ECONOMICAL WAY!

Easily moved to desired position

Quickly plugs into power outlet

Discharges conditioned sand to any desired distance within 25 ft.

SCREENARATOR

The Screenarator conditions sand at lowest cost!

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2. Frees it from core butts, gaggers and other foreign matter.
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Electrically operated, the Screenarator is ideal for small, medium, and large foundries. Screenarators are in use in hundreds of foundries throughout the world . . . recognized as the accepted method of sand conditioning.

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The adventures of BILL

By PAT DWYER

Drawings by RICHEY

A NICE soft rain about this time of the year licks up most of the snow—I hope—and converts the remainder into what the poetic fellows call little gurgling rills that soak the feet of pedestrians on street and sidewalk and carry all the dead leaves and accumulated filth into the gutters and thence in noble streams into the manholes. At one period of my existence, in company with other bold adventurers, I floated corks, chips and odd pieces of wood down these rushing rivers and watched them disappear with almost the same degree of awe and admiration as I afterward experienced in reading the late Mr. Poe's spirited description of the whirling Maelstrom off the coast of Norway.

Just why we should be reprimanded orally and physically while playing this innocent and entrancing game was as great a mystery to us at that time, as apparently it is, to certain small descendants who I understand were dragged in today soaking wet, squealing and protesting violently. An earnest round-table discussion considered all the possible and probable symptoms, causes and remedies for coughs, colds, hoarseness, sore throat, laryngitis, whooping cough and all diseases of the respiratory organs, the chest, throat and lungs. Asked for an opinion on the subject, my slightly shaky reputation for adherence to the truth under any or all provocation, showed a marked drop when I declared brazenly that in my young days, the boys ran around in the snow all winter in their bare feet. Saw half a dozen of 'em last summer. Not a cough or a cold in the bunch. I was not consulted further. One saucy young member whispered that she never had seen my bare feet, and a possibility existed that they were like those of certain domestic animals. "You know," she said, "all bone with no feeling in them!" A stern look from the old eye halted her while she wondered if my shoes were made in a blacksmith shop.

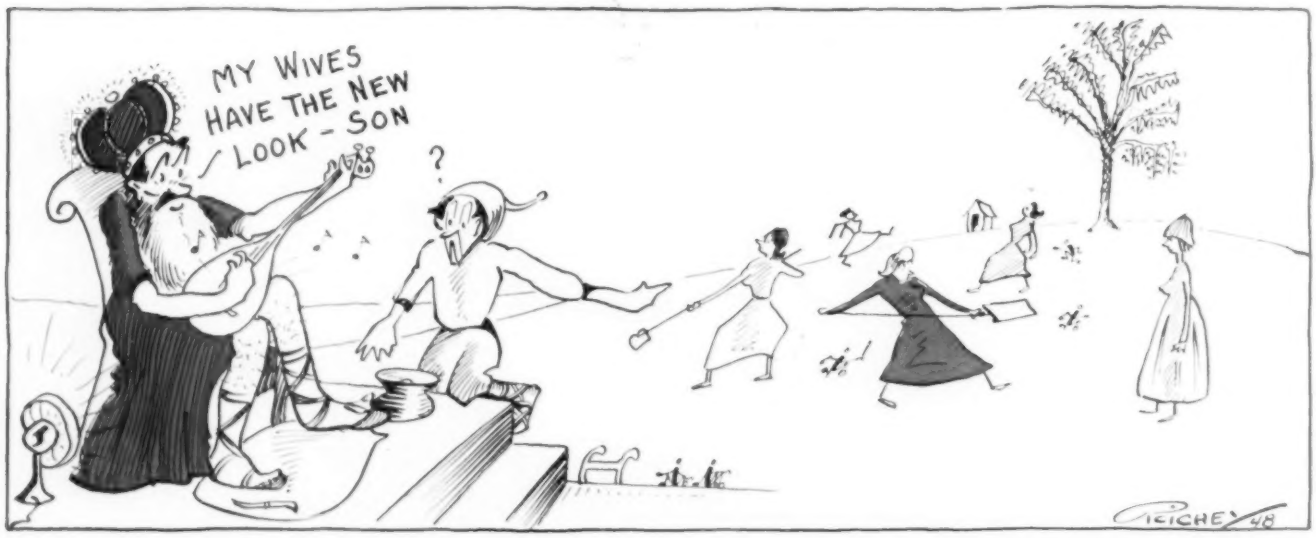
These and other random remarks sent my mind wandering into the ancient past where permission to eat the flesh of animals depended on whether the foot or hoof was in one or more sections. Association of ideas, prompted in the first place by the sight of the gently falling rain brought King Solomon to mind. At various times a glimpse through some of the works presented under his name, indicated that the old boy was endowed with more than the ordinary amount of one of the rarest of all human attributes, known, for want of a better name, as plain common or horse sense. His comments on many things might have been written yesterday instead of nearly 5000 years ago. For example, consider his ode to Spring. Years and years ago, the great wise king, lute in hand, sat on his ivory, gold and peacock throne and lifted up his voice in song. Two brief excerpts indicate that he was in excellent form:

For lo, the winter is past, the rain is over again, the flowers appear on the earth, the time of the singing of birds is come; and the voice of the turtle dove is heard in the land. The fig tree ripeneth her green figs and the vines are in bloom. They give forth their fragrance. *Song of Solomon II*, 11-13. **** a Garden shut up is my sister, my bride. A spring shut up, a fountain sealed. Thy shoots are an orchard of pomegranates with precious fruits; henna with spikenard plants; spikenard and saffron, calamus and cinnamon with all trees of frankincense, myrrh and aloes; with all the chief spices. Thou art a fountain of gardens; a well of living waters and the flowing streams from Lebanon. *Song of Solomon IV* 12-15.

Only the people familiar with deserts and semiarid lands truly appreciate the value of pure, sparkling, running water.

Bill was inclined to be mildly critical when I retailed some of the foregoing events and observations. "That was a happy touch about the bare feet in the snow," he said. "Nothing like a good, bold statement, right or wrong, to settle an argument. All that stuff about Solomon sitting in the garden like Old King Cole, whanging on a lute and singing about the spring, is just so much rannygazoo. If the whole truth was known, he probably sat there with

(*Continued on page* 200)



Looks very much like Petrillo telling Solomon he must have an assistant while knocking off a popular number

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One man now unloads a car in 5 hours where formerly 3 men took 36 hours.

Handling Costs Reduced 86%

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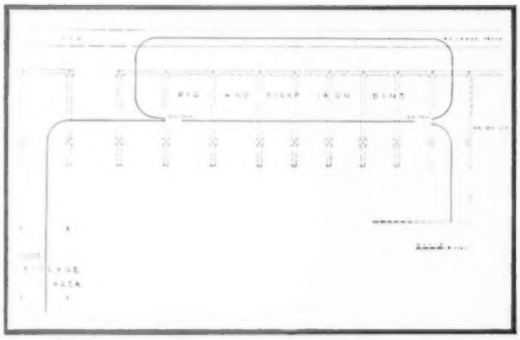
American MonoRail System also used for storing copes and breaking scrap with 1000 lb. steel ball.

At this plant it formerly took 3 men appoximately 36 hours to unload and store a car of pig or scrap iron. With the American Mono-Rail system one man now accomplishes the same job in 5 hours.

The savings in time is just part of the story since the system is used for breaking scrap as well as storing copes.

American MonoRail engineers often prove marked reduction in handling costs. They have hundreds of cases from which to draw. A consultation can be quickly arranged.



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AMERICA'S LARGEST PRODUCERS OF ALLOYS

We are again happy to be able to extend to our many friends a sincere invitation to visit with us at the 52nd Annual Foundry Congress and Foundry Show at Philadelphia.

Many members of our staff will be in the Booth to discuss with you the latest things in alloys and metallurgical procedure. If you have a problem, discuss it with us. We can probably help you solve it as we have thousands of others.

We will be looking for you.

NIAGARA FALLS
Smelting & Refining Division
Continental-United Industries Co., Inc.
BUFFALO 17, NEW YORK

(*Continued from page* 198)

one leg cocked over the other. He plucked the strings with one hand and beat time with the foot resting on the ground. The performance was designed to keep his army of wives and deputy wives busy at their allotted tasks in the garden. He was too wise an old bird to keep a flock of 1000 women around the house all day doing nothing.

"The sight of so much activity also may have knocked some of the ambition out of the potential mailing list, and the mob that came to the employment office every morning and passed an idle hour or two gawking over the fence into the garden. Without doubt many a smart little maiden turned up her nose and made a bee line for the old homestead. Wielding a hoe in a pair of blistered hands all day for a year or more was too high a price to pay for the doubtful honor of being rated as Mrs. Solomon (No. 999) and of passing in review, eyes modestly cast down, before the great man for a few minutes once every three years.

"This here idea of knocking out a lively tune to keep the help stepping briskly was not copyrighted by old Sol. It has been employed on many occasions ancient and modern. Perhaps you remember a very enjoyable scene in the facinating screen version of that charming little lady Snow White. Her faithful admirers, the seven little shorties, while manfully plying pick, hammer and shovel, smashing the big ones into little ones to extract the gold and jewels, whistled while they worked. A very tuneful roundelay indeed in which they enthusiastically were aided and abetted by all the birds in the neighborhood."

Carried away by a very natural enthusiasm Bill cocked a lip and gave a spirited rendition of the sprightly and catchy little ditty. The pickaxe, shovel and hammer obligato was performed in a very creditable manner with two long handle spoons and a dish pan.

"I can follow the king when he talks about pomegranates, but he is away over my head when he drags in the henna with spikenard; spikenard and saffron, calamus and cinnamon; with all trees of frankincense, myrrh and aloes; with all their chief spices. None of that stuff in the garden where I toiled and sweated as a boy for 50 cents a day. No premium or bonus on the days I carried huge buckets from one place to another while whitewashing the picket fence. Down to this day I hate

(*Continued on page* 202)

remove metal faster... at less cost with CLECO GRINDERS

See our exhibit in booth 617
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The result is fast grinding, long grinder life, and low operating and maintenance costs.

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Bulletin No. 80A describes the complete line of Cleco Grinders. Write now or contact our nearest distributor or dealer.

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"SUPERFLAKE" FOUNDRY PRODUCTS

	MOLDUKO CORE & MOLD WASH Will ship **10 Gals. of Molduko** & **25 lbs. of Filler** at full drum prices for test purposes.
	HYDRO GRAPHITE ***(It's New!)*** Excellent permanent mold wash.
	CARBON-RAISER (Add to the metal in the ladle, at the spout, in the furnace or in the cold charge) **IRON FOUNDRIES** use to control depth of chill and improve the machineability of the cqstings. **STEEL FOUNDRIES** use to control carbon content, in the ladle and in the furnace quickly, accurately and efficiently.
	PIPE REDUCER Used on "Gates" and "Risers" in Steel & Iron foundries.
	PLUMBAGO & CORE WASHES In both Dry and Paste forms.
	LADLE WASH
	MUDDING COMPOUNDS
	CORE PASTES Strong bond, Dry quickly.

Please send me samples and further information on the products checked above.

Name ..... Title .....

Company .....

Address .....

SUPERFLAKE GRAPHITE PRODUCTS

SUPERIOR FLAKE GRAPHITE COMPANY

Manufacturers of mold and core washes, facings, parting compounds, core paste, carbon-raiser.

TELEPHONE: RANDOLPH 7939

33 So. Clark Street *Chicago (3) Ill.*

(*Continued from page* 200)

the smell of lime. And I don't jump up and down, stamping the clogs and rattling the old paws together, when some counterfeit male or mousie voice female radio performer croaks or moans about what happened 'Down in the ga-a-rden where the praties grow."

"You will pardon me," I said, "if I am mistaken, but in a general way I have gathered the impression (a) that gardening is not your hobby, (b) that you do not approve of Solomon's domestic policy and (c) that the advent of spring does not touch you on a tender spot, induce you to twine garlands of flowers in your hair, and prance up and down the woodland

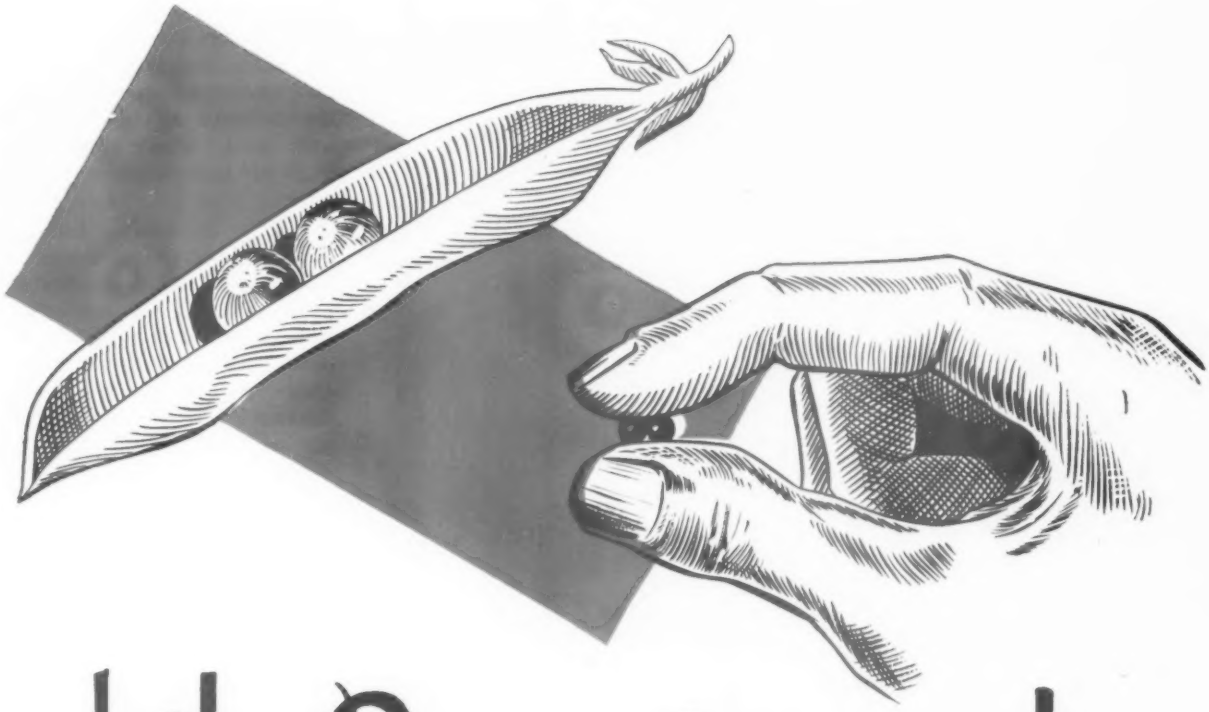
Bless their dear little innocent hearts

dells improvising what is known as hot stuff on a set of reed pipes."

"Pon my word," Bill exclaimed admiringly, "pon my word, at times you display evidence of almost human intelligence. Stick around a while with your ears open and your mouth shut and I may be able to do something with you. I realize these are hard conditions, but as my old uncle Malachi used to say, 'What's worth havin', is worth fightin' for!'

"To me spring begins on the first of April, and in turn the first of April brings to mind the liberty and license enjoyed and practiced on that day by the never-grow-ups who derive the keenest pleasure in reviving bits of sharp practice highly popular in the old school days. Leaving a note on a man's desk asking him to call a certain telephone number and ask for Mr. Fox, or Mr. Wolf or Mr. Bear always is good for a hearty all around laugh when the victim discovers that Sunshine 8756 is the

(*Continued on page* 204)



Like 2 peas in a pod...

Most brands of shot and grit look as much alike as peas in a pod. Certainly you can't tell the kind of cleaning or peening job they will do by their appearance. Even ANNEALSHOT's distinctive, metallic blue color only makes it easier to identify, but doesn't tell you how much more economical it is. You have to *use* an abrasive to know what it will do.

ANNEALSHOT is annealed for toughness. It lasts at least 15% longer on the average. It is easier on your equipment. It costs no more than standard shot. Order a trial lot today and see for yourself. Or, we will gladly furnish a free sample so you can make a laboratory test. Write us today.

TOUGHER BECAUSE IT'S ANNEALED

PROLONGS THE LIFE OF YOUR EQUIPMENT

A SIZE FOR EVERY PURPOSE

COSTS NO MORE THAN ORDINARY SHOT

ANNEALSHOT by *Metal Blast*

METAL BLAST, INC.

872 EAST 67 STREET • CLEVELAND 3, OHIO

Reduce Scrap Loss in Pressure Castings-

with

Milwaukee

Thread Stem Chaplets

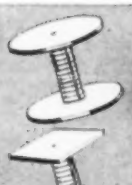
The design of these chaplets insures complete, thorough fusing in any casting . . . a vital factor in reducing scrap loss due to "leakers."

This *complete fusion* is assured by the many sharp, coarse rings . . . having a larger diameter than the stem itself . . . which run from head-to-head on Double Head Chaplets. The use of Milwaukee Thread Stem Chaplets permits a heavier stem than would otherwise be possible. This results in the added benefit of a well secured core as well as a pressure-tight casting.

Milwaukee Thread Stem Chaplets are used extensively in all types of castings subject to gas, steam, oil or water pressure where leakage means "scrap." They are made of low-carbon steel, coated for rust-proofing . . . in any lengths, stem diameters and head sizes. They cost no more than ordinary chaplets. Pure aluminum Thread Stem Chaplets are available in small sizes.

Manufacturers of the Milwaukee-Tessmer Sprue Cutter for Non-Ferrous Castings.

MILWAUKEE CHAPLET & MFG. CO.
1025 S. 40th STREET, MILWAUKEE 4, WISCONSIN



MILWAUKEE CHAPLET

(*Continued from page* 202)

telephone number of the city zoo. Variations on this basic idea are almost endless. Ask for Mr. Coffee at the grocery store; Mr. Bird at the pet shop; Mr. Hop at the brewery; Mr. Oxford at the shoe store. The list includes all kind of places all over town. Every year the brighter boys add new numbers to their repertoire.

"When an ardent fisherman answers the telephone, a carefully disguised voice inquires politely, 'Is this the residence of J. Ananias Caster?' Assured that this is the residence indeed of Mr. Caster, and that Mr. Caster himself is speaking, the voice thanks him sweetly and begs him to please hold the line for a moment. And there he is left dangling in the air like one of his own fishes. The old high hat with a brick or a hunk of pig iron on the inside still tempts the pedestrian. Firemen lurking in their dens and peering through the windows vary the monotony of their existence by throwing one or more red hot pennies on the sidewalk. In other instances the pennies are glued solidly to the asphalt, or attached to a long string leading under the door. By all these signs and maybe a brief glance at the calendar you know that April 1 and spring are here just as well as Solomon did when he took his ease in the garden and lifted up his voice in song.

"Probably the modern apprentice, a high school graduate able and willing to drive his father's car at racing speed, is too clever and sophisticated to fall into any of the old fashioned traps set by the journeymen. In the old days the little dumb bunnies, refugees from the third grade, spent many an hour on useless errands seeking left hand monkey wrenches, half round squares, the key of the steam chest and the yellow hammer, special grease for the slide rule, the side hill shovel and the answer to the riddle.

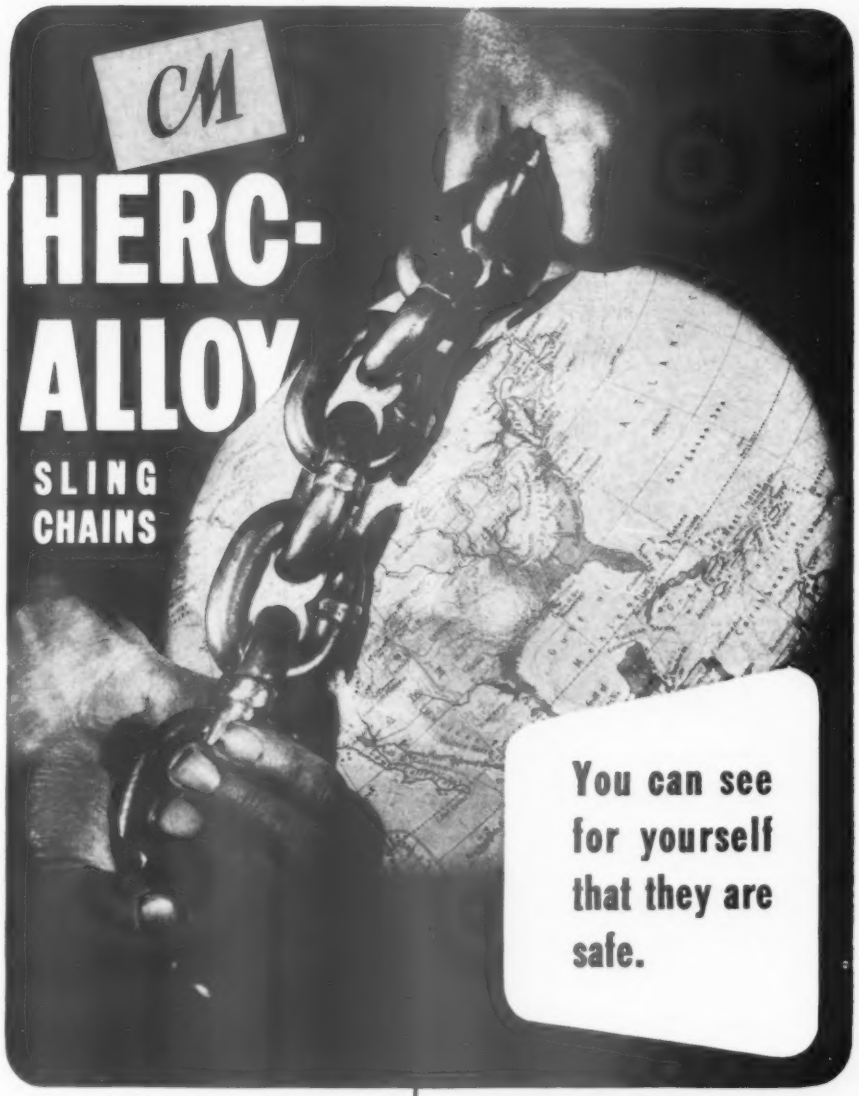
"I also know that spring is here when I begin to get letters from boys out on the firing line. I had one the other day from a man who wrote that he made many small wheels in various sizes and was troubled by cavities small and large that do not appear until the hubs are machined. Each wheel includes a steel rim, steel spokes and a cast iron hub. The rim and the core sections which form the hub are set up in a jig. A weight holds the cores in place. The metal enters the upper part of the hub through a thin knife gate. Since all the molds are made according to the same method, he was at a loss to un-

derstand why some hubs are defective.

"Cavities in the hubs are caused by gas developed when the molten iron comes into contact with the steel spokes covered with a thick or thin film of iron oxide, commonly known as rust. Where the ends of the spokes are perfectly dry and clean, no gas is developed and the resulting castings are clean and solid. Partly recognizing the cause and effect, some foundrymen heat the ends of the spokes under the impression that the heat will remove the rust. This would happen if the spokes were raised to a welding heat, but they never are raised to that temperature. The result is that the fire simply adds a thin film to the surface. The second stage of the spoke is worse than the first. The inner ends of the spokes are upset in a bolt heading machine usually known as a bulldozer. Small spokes may be upset cold, but the heavier spokes are heated for the process. The resulting film in the majority of instances is inert and does not cause any trouble. In other instances it produces gas. It is advisable to clean all spoke ends before they are placed in the molds. A brief period in a tumbling barrel or exposure to a stream of sand or metal abrasive is sufficient.

"A rather remote but still possible cause of a cavity in the hub casting is a crack in the bottom, or in one of the lower cores which form the mold. If the core cracks before the outer part of the hub has solidified, some of the liquid metal in the interior may leak through and leave a cavity. However, the evidence in this case would be so prominent, that it could not escape attention. Another feature which might be emphasized is the practice of running a small quantity of metal through the riser. Where the disturbance is light and the volume of gas is small, this practice of flowing metal through the riser will carry the gas bubbles away and produce a solid hub. All the foregoing, as in general medical practice, is concerned with remedying an existing condition. The proper and best practice, as the Chinese discovered centuries ago, is to prevent a condition that requires subsequent treatment. Perfectly clean, dry spokes will not create any gas when surrounded by molten iron."

Tabor Mfg. Co., 6225 Tacony St., Philadelphia 35, has expanded the sales territories of its representatives E. R. Frost Co., 1179 Fifteenth Ave. SE, Minneapolis, and M. W. Warren Coke Co., 1017 Olive St., St. Louis.



● Just one of the big advantages of HERC-ALLOY Sling Chains is that you can determine their serviceability by a simple visual inspection.* Ordinary steel or iron chains, on the contrary, grow dangerously brittle with age... an insidious threat to the safety of men and materials. That's why more and more of the important companies are standardizing on HERC-ALLOY Sling Chains...because you can **see** for yourself that they're safe.

Write for your copy of this new, informative booklet. No charge.

HERC-ALLOY FEATURES

- America's *first* alloy steel sling chain...first to bear a serial number.
- *Every* CM HERC-ALLOY Sling Chain is alloy steel throughout...links, rings, hooks. There is only one grade...*the best.*
- Every chain is individually tested and accompanied by a certificate of registration.
- Links are side welded for maximum strength by patented INSWELL electric method.
- HERC-ALLOY Chains should never be annealed.
- HERC-ALLOY Chains are lighter...stronger...easier to handle...outlast ordinary chains 4 to 5 times...cost less on the job.

HERC-ALLOY...the chain you can SEE is safe

COLUMBUS-McKINNON

CHAIN CORPORATION

(Affiliated with Chisholm-Moore Hoist Corporation)

GENERAL OFFICES AND FACTORIES: TONAWANDA, N. Y.

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Ohio Electric announces a welded lifting magnet with *PROTECTO-WELD* design

The easiest way to protect the weld on a welded lifting magnet is obvious: PUT IT ON TOP.

That's the big advantage of new Ohio PROTECTO-WELD magnets. Outer ring and top plate are welded together *on top of the magnet.* Frequent blows against the outer ring *cannot crack or damage the weld.* Ohio PROTECTO-WELD magnets remain hermetically sealed against moisture indefinitely!

Three sizes of this new magnet are now in production. They measure 39, 55 and 65 inches in diameter. Name the lifting job—we can give you all the strength you need. Besides the 4-coil construction, there are also 6 or 8-coil magnets for that *extra Ohio lifting strength.*

These PROTECTO-WELD magnets have the well known Ohio chain pins that fit into square-holed ears—to eliminate friction and prolong life. Ohio Armored Weatherproof cable connectors withstand severe abuse. Bayonet joints for hand operation save time in making and breaking connections. Shielded contacts provide safety from arcs.

This new Ohio PROTECTO-WELD magnet is a rugged tool for your roughest jobs. *Details?* Write today to Ohio: *leader in magnetic materials handling.*

Ohio MAGNETS

also a leading name in the small motor field

THE OHIO ELECTRIC MFG. CO.

5910 MAURICE AVE. • CLEVELAND 4, OHIO

ASTM Arranges Annual Meeting

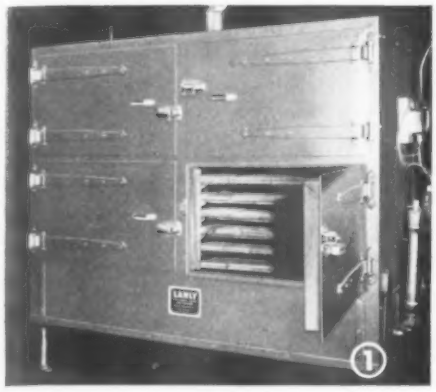
The 1948 annual meeting of the American Society for Testing Materials will be held in Detroit, June 21 to 25. During the week some 20 technical sessions covering various aspects of the field of materials are scheduled. Topics included are: "Symposium on Conditioning and Weathering"; "Creep, Stress Rupture and Short-time High-temperature Tension Testing"; "Roundtable Discussion on Spot Identification Test"; "Symposium on Mineral Aggregates"; "Symposium on Magnetic Testing"; "Symposium on Latest Methods of X-ray and Gamma-ray Inspection", and others. In addition there will be more than 300 meetings of the society's technical committees, and throughout the week the Eighth Exhibit of Testing Apparatus and Related Equipment will be in progress.

Interesting feature of the meeting will be the 1948 Edgar Marburg Lecture to be delivered by Dr. Paul Aebersold, chief of the Isotopes Division, Atomic Energy Commission, Oak Ridge, Tenn., on Thursday evening, June 24, at Rackham Memorial building. Dr. Aebersold will discuss the industrial applications of isotopes which have such phenomenal prospects for industry and mankind. ASTM President T. A. Boyd, General Motors Research Laboratories, will present his annual address at the dinner on Wednesday, June 23.

General committee for the meeting is functioning under the ASTM Detroit District Council headed by V. M. Darsey, Parker Rust-Proof Co. Other committee chairmen include: C. H. Fellows, Detroit Edison Co., arrangements; C. E. Heussner, Chrysler Corp., ladies entertainment and dinner; J. J. McCloud, Ford Motor Co., exhibits; F. G. Weed, Rinshed-Mason Co., photographic exhibit; F. P. Zimmerli, Associated Spring Corp., plant visits and transportation; F. C. Kennedy, U. S. Rubber Co., publicity; B. C. Case, Hanson-Van Winkle-Munning Co., finance, and F. C. Gambrill, Ethyl Corp., housing and hotel facilities.

Picks Representative

Lester-Phoenix Inc., Cleveland, national distributor of Lester injection molding machines and Lester-Phoenix die casting machines, has appointed Thoreson-McCosh, 1115 Book Bldg., Detroit 26, as its representative in the Detroit area.



Foundry Ovens

for ALL FOUNDRY REQUIREMENTS

Whether your particular requirements concern core baking, pasting and mold drying, or ovens and air draw furnaces for casting conditioning and heat treating, the LANLY organization of experts is well qualified to serve you.

If a LANLY standard unit does not fit into your picture, we'll design and build one that will.

LANLY efficient convection type air heaters and balanced re-circulating systems are but two of the advanced design features which have attributed strongly to the ever growing acceptance of LANLY as an established authority in the field of foundry ovens.

Write for the Catalog containing a list of purchasers and an illustrated description of the entire list.

Some Typical LANLY Ovens

FIG. 1 — A Lanly Shelf Type Core Oven. This unit is heated by means of burners located directly under the work chamber. Available in several standard sizes.

FIG. 2 — A Two Compartment Car Type Mold Drying Oven. Each compartment individually heated and controlled.

FIG. 3 — A Rack Type Oven which accommodates two racks side by side with a single set of doors. Installed where space limitations do not permit separate openings for each rack.

FIG. 4 — Three Compartment Rack Type Oven is equipped with combination oil gas burner equipment. The change from oil to gas or vice versa can be made in a few minutes.

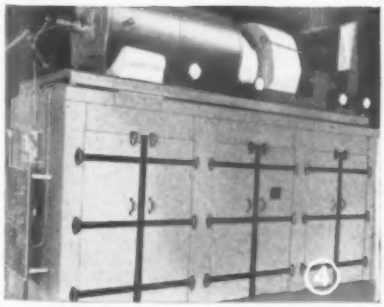
FIGS. 5 & 6 — A Combination Shelf. Drawer and Truck Type Oven. Heat is furnished by one efficient Lanly forced convection system.

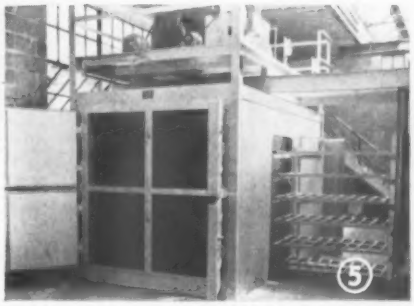
THE LANLY CO.

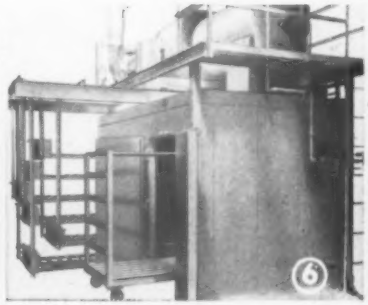
OVENS FOR INDUSTRY

HEATED BY GAS, OIL, ELECTRICITY OR STEAM

750 PROSPECT AVENUE · CLEVELAND, OHIO







Write for Bulletins on LANLY Finishing, Cabinet Type and Heat Treating Ovens

VALVE MANUFACTURER

Expands

By JOSEPH C. SULLIVAN
Pittsburgh Editor
THE FOUNDRY

AN important phase of Homestead Valve Co.'s $400,000 expansion and modernization program at Coraopolis, Pa., includes the revamping of its foundry operations to meet the augmented demand for gray iron, brass, bronze and alloy castings for the company's products.

Initial steps in this program were to build an addition to the southeastern side of the foundry to house an enlarged coreroom; installation of a new core oven, also a portable sand mixer for core sand and preparation of facing sand for brass and iron castings. Space formerly occupied by the coreroom was used to enlarge the cleaning and grinding departments.

Increasing the floor space of the cleaning department gave the company an opportunity to rearrange the grinding machines for a smoother flow of material and replace obsolete equipment. A new airless blast barrel was installed.

This was followed by a rearrangement of the molding floor. Under the old system the molder shoveled sand from the floor. The molds were then placed on roller conveyors for pouring, and after pouring castings were shaken out on the floor near the molding station. The sand was blown back on the pile for the molder by a sand mixer. This method was replaced by an overhead sand distribution system, sand storage bin and floor level shakeout and a dust control system. New molding machines receive sand from individual hoppers.

After molds are made they are set out on the conveyors, poured off, stripped of their jackets, placed on a transfer buggy and taken to the shakeout where the castings are freed of the sand and set aside to cool before cleaning and grinding. Sand is carried away by belt and bucket conveyor to equipment for reconditioning before going into the storage bin to be distributed later to the molding stations.

Standardization of flask size and use of slip flasks and jackets eliminated considerable flask storage space. Shifting weights and jackets from poured molds to molds waiting to be poured eliminated the transfer of flasks from shakeout back to the molder. The only storage space needed at the molding station is for bottom boards and cores. Mold output has been increased 50 to 75 per cent without any added effort on the part of the molder and with less floor labor needed to handle molds at the shakeout.

Metal requirements expanded in proportion to the increase in mold output. All nonferrous work could be

1

Foundry

handled easily with three No. 100 pot gas-fired crucible furnaces, two No. 150 pot coke-fired crucible furnaces and one 1000-pound open flame furnace. However, ferrous work was overtaxing a 2000-lb gas-fired furnace capable of two heats per eight-hour day and a 22-in. cupola with its 4000-lb maximum output. The second shift then was used to clean up the molds left over on the conveyor racks, with no productive molding. Consideration was given to increasing floor space for temporary storage of molds and having them poured off at night, but this wouldn't answer the problem of increased output by molding and pouring on the second shift.

It was decided to purchase a gas or oil fired 1200-lb Sklenar noncrucible reverberatory furnace, capable of one heat an hour. Subsequently, a similar furnace of 2000-lb capacity has been added.

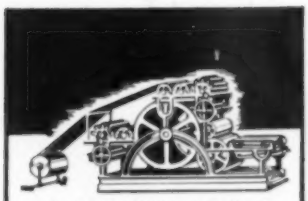
Operating experience to date has shown that an adequate amount of hot metal of specific type needed is available at all times. Molds are poured off every hour

Fig. 1—One of two new reverberatory furnaces used in melting gray iron

Fig. 2—Pouring castings at Homestead Valve Co.'s modernized foundry

Fig. 3—Molding stations receive sand from overhead distributing system. Molds are set out on roller conveyors for pouring

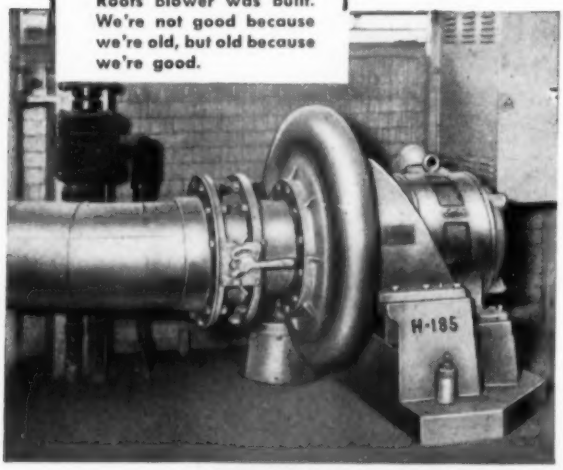
Fig. 4—Oven installed in the enlarged coreroom



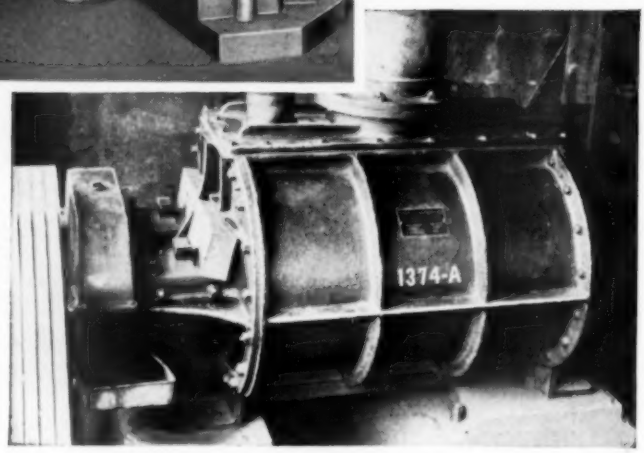
In 1865, William Bullock built the first press which printed from a continuous web or roll. Eleven years earlier, in 1854, the first Roots Blower was built. We're not good because we're old, but old because we're good.

Exclusive Service...

R-C dual-ability



R-C Centrifugal Blower, motor-driven, in foundry cupola service. Capacity 4,400 CFM.



R-C Rotary Positive Blower, for cupola service. Capacity 4,000 CFM at 16-oz. pressure.

You obtain an important, exclusive advantage when you consult us about problems of moving air or gas. That is, our *dual-ability* to supply either Centrifugal or Rotary Positive units.

This *dual choice* allows you to match equipment exactly to your needs, in capacities, pressures and other characteristics. You can have standard Rotary Positive units from 5 CFM up, or Centrifugal units to meet your top requirements. You save time, trouble and money.

So, utilize this exclusive *dual-ability* by consulting us on your requirements. The economy and dependability of R-C Blowers have been proved for almost a century.

ROOTS-CONNERSVILLE BLOWER CORPORATION
804 Madison Avenue, Connersville, Indiana

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ROTARY CENTRIFUGAL
BLOWER BUILDERS R-C SINCE 1854
BLOWERS · EXHAUSTERS · BOOSTERS · LIQUID AND VACUUM PUMPS · METERS · INERT GAS GENERATORS

ONE OF THE DRESSER INDUSTRIES

and removed, permitting the same floor area to handle a greater number of molds than formerly.

The 1200-lb capacity furnace is oblong in shape, 8 ft wide, 10 ft long, and is 6½ ft tall at its highest point. Burners are located at one end of the furnace and the exhaust chamber, which also serves as a retaining hopper, on the other end. The pouring spout is centrally located. Hearth of the furnace is formed by a curved shell, making depth of bath after lining vary from 6 in. at the spout to a feather edge at both ends.

The initial melt from this furnace was run out at 2700° F in 40 minutes after charging. The furnace has been kept running continually since, except for necessary repairs. A check of fuel use to determine melting cost revealed that for 268 heats the total gas consumption was 1,783,388 cu ft. Metal output during this period was 281,611 lb, making gas consumption 12,666 cu ft per ton of metal produced.

Operation Cost Is Low

Recently the furnace has operated on an eight-hour day basis, and is preheated one hour before charging. The unit produces six 1200-lb heats at a total gas consumption of 34,560 cu ft, or 9600 cu ft per ton of melt.

Company's records for the first year of operation show that the cost of operating the 1200-lb unit was but 0.3-cent per pound of metal including gas, labor and lining costs. The furnace lining life is said to be long, with over 90,000 lb of iron melted before patching becomes necessary or 180,000 lb before complete relining.

Efficiency of the furnace is directly controlled by the size of the throat opening at the bottom of the exhaust chamber. When the unit was installed it was found that after 20 heats a drop in temperature of metal and an increase in melting time occurred. This was first controlled by making a set of doors to close up the top of the hopper so that the exhaust area would be equal to that of a newly lined furnace. This controlled the exhaust area but after the furnace ran for 40 or more heats the area of the opening between the throat and arch increased to such an extent that the greater portion of the charge entered the furnace proper and very little advantage of preheating the charge by the exhaust gas was accomplished.

This led to the following revision in method of relining the furnace: The hearth was made flat, the lower third of the retaining hopper is used to control the exhaust opening and the recuperator was taken out to en-

(*Concluded on page* 212)

A 1948 CAR WITHOUT A STARTER WOULD BE LIKE A 1948 FOUNDRY *without...*

Thousands of foundrymen say, "We couldn't do without Royer"

BETTER CASTINGS requiring less machining and polishing are obtained when sand is separated and blended by Royers . . . with fewer rejects due to skids, runouts and surface inclusions.

BETTER EMPLOYEE RELATIONS in a cleaner, less crowded plant.

BETTER PRICE to customer, thanks to lower labor costs, sand economies and fewer rejections . . .

which add up to

Happy Customers
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Any foundry still blending and riddling by hand is tolerating a horse-and-buggy operation . . . and is in no position to compete with plants using ROYER SAND SEPARATOR & BLENDERS.

Royer machines eliminate all hand labor except shovelling into the hopper. They automatically perform six vital sand conditioning operations:

1. Comb and blend old sand, new sand and bond
2. Break up all lumps and clay balls
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4. Reject burnt cores, trash, foreign objects
5. Double aerate sand, cooling and degassing it
6. Increase permeability 10 to 20 points

More than 7500 Royers now in service. Many have seen 10 to 15 years daily use and are still doing a grand job. Write today for Bulletin 744—it gives full specifications for all Royer models.

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ROYER

FOREMOST IN SAND CONDITIONING EQUIPMENT

ROYER FOUNDRY & MACHINE CO.
159 PRINGLE ST., KINGSTON, PA.

(*Concluded from page 210*)
large the holding capacity of the hopper.

Operating versatility of the furnace and melting speed are illustrated by a typical day's melt. The furnace is started cold at 7 a.m. After preheating, the first heat of 1200 pounds Class 20 gray iron is charged at 8 a. m., tapped at 8:40. The second heat of Class 40 iron is charged at 9:05, tapped at 9:45. Third heat of Ni-resist iron is charged at 10:15 and tapped at 11:05 a.m. The same melting cycle is used for the 2000-lb furnace, recently installed. The units are capable of going from an oxidizing to a reducing atmosphere by simple adjustment of an aspirator valve.

The company has been able to make alloys of 20 per cent nickel, also 2.75 per cent chromium and has charged as much as 25 per cent steel with no difficulty in the melting. Castings produced cover a wide range, varying from soft gray iron to those able to withstand 1500 psi pressure; tensile strength of the various types range from 20,000 to 60,000 psi, and casting sizes from 1 ounce to 600 lb.

Considerable difficulty was encountered with slag entering the pouring ladles when the 1200-lb furnace was tilted to fill a 400-lb ladle with metal. This was overcome by changing the pouring spout to resemble the breast of a cupola. In this way the metal is kept slag free and the bath of metal is protected from oxidation until the furnace is emptied. The slag is then poured out of the furnace. An air cylinder is used to tilt the furnace for the pouring operation.

A crew of three men is used in the operation of this furnace and four men when the 1200 and 2000-lb units are run simultaneously. They weigh up all the heats for the furnace, pour the molten metal, keep all ladles in repair and handle necessary maintenance work on the unit. A lift truck and bucket are used to charge the furnaces.

TROUBLE-FREE PRODUCTION of quality castings doesn't just happen. The skill and know-how of diecaster or foundry is of prime importance. But the most skilled of craftsmen must have the right raw material to work with.

Whatever your casting problem may be —die cast—permanent mold or sand cast. Specify **S-G** Aluminum Alloys. Every step in their production is checked constantly by skilled laboratory men using the most modern equipment available.

You can rely on **S-G** Alloys—they meet your most rigid specifications—they help you get results that mean profits.

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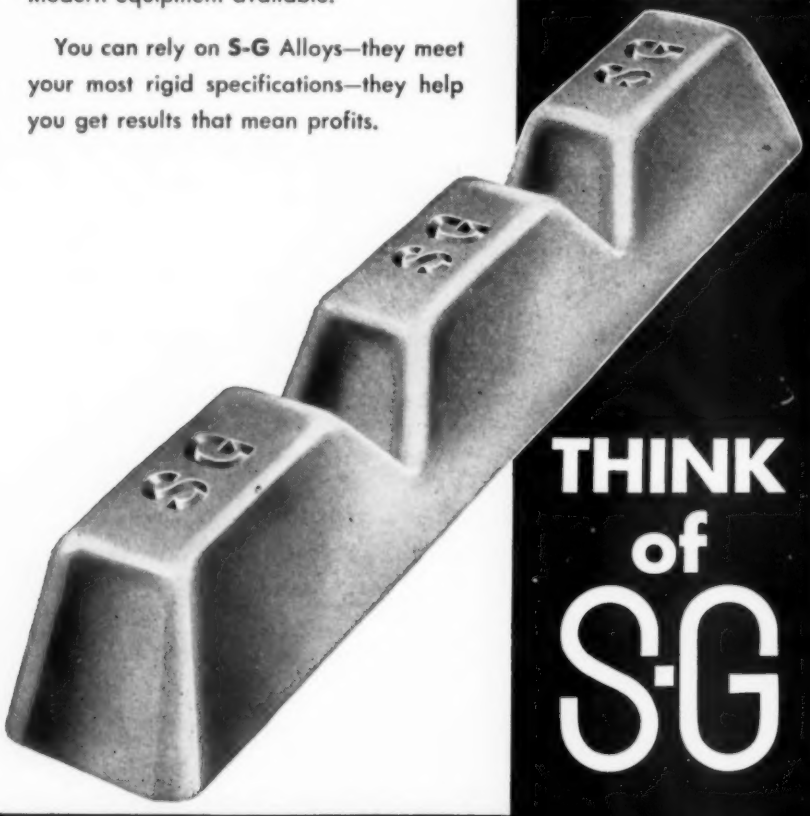

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Gray Iron Founders' Start Local Groups

Gray Iron Founders' Society, national trade association of the gray iron castings industry, is continuing its organization of a series of forty local society groups of executives throughout the United States.

At a recent meeting at Paxton Hotel, Omaha, Nebr., E. B. Christensen, secretary, Paxton-Mitchell Co., Omaha, was elected chairman of the local group. A. L. Katelman, manager, Katelman Foundry & Mfg. Co., Council Bluffs, Iowa, was named secretary-treasurer.

In Davenport, Iowa, at the Blackhawk Hotel, the local group elected Pete L. O'Neill, vice president, Dexter Co., Fairfield, Iowa, chairman. Charles F. Scherer, Davenport Machine & Foundry Co., Davenport, is secretary.

Foundry Film

A new 16-mm motion picture, "New Foundry Horizons," sponsored by National Engineering Co., 549 West Washington, Chicago 6, is available without charge to interested groups. Among the subjects included in the film are: Core blowers, sand handling and distribution, molding, semicontinuous mold conveyors, shakeout, cleaning and annealing.

The 1200-ft black and white film is completely titled and needs no accompanying lecture during its 40-minute projection. It may be borrowed by writing to "New Foundry Horizons" care of National Engineering Co. at the above address.

LIFE in an iron foundry...with

The BELL *Prime Mover*

Meet Adam Chuheki. At 68 he can do a day's work that puts any young husky to shame... is more productive than ever.

His job: keeping coremakers and molders supplied with core and facing sand...as much as 100 tons in a single 8-hour shift.

With his new BELL Prime Mover, he steps briskly along, stops for a moment at the muller, and picks up 1000 pounds of sand.

He swings the Prime Mover around in its own length, lets in the clutch and moves across the bumpy floor with his half-ton load. Even mud can't slow him.

Come four o'clock, Adam starts jauntily homeward. On three gallons of gas and with minimum effort, his Bell Prime Mover has done the work of a four-man wheelbarrow gang.

And this is the BELL Prime Mover, a boon to workers old or young, a "must" for cost-conscious management...wherever the time-honored wheelbarrow is used.

FEATURES:

- takes half-ton loads up 20% grades
- bucket holds 10 cu. ft. . . . 18 with sideboards
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- fully enclosed engine protected against dirt and moisture
- clutch, engine, transmission all run in oil
- half-ton platform body available; also 50-inch "baby bulldozer" blade
- switch from bucket to platform without tools . . . in less than a minute
- turns in its own length (63½"); width 31½"
- 3-gallon tankful of fuel gives 8 hours continuous service

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Please send me engineering and cost data on the Prime Mover, including users' experience in iron and steel foundries.

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WISCONSIN *Conference Report*

By EDWIN BREMER, PAT DWYER and ERLE F. ROSS
THE FOUNDRY

Indicative of the keen interest in promoting production of high quality castings and their application, nearly 600 foundrymen attended the eleventh annual Regional Foundry Conference staged by the Wisconsin Chapter, AFA, in co-operation with the University of Wisconsin. Meetings were held Feb. 12-13 at Hotel Schroeder, Milwaukee.

At a luncheon held Thursday noon Robert A. Ewens, Wisconsin Manufacturers' Association, spoke on "The Wisconsin Centennial and the Foundry Industry." Hon. Frank B. Keefe, member of Congress, discussed "Foreign Relations" at the annual banquet, and at Friday's luncheon W. B. Wallis, Pittsburgh Lectromelt Furnace Corp., Pittsburgh, and vice president of the AFA, and S. C. Massari, technical secretary, AFA, spoke briefly on AFA activities, while George K. Dreher, Foundry Educational Foundation, Cleveland, discussed "Preparation for the Engineering Process."

Stresses Mutual Interests

The conference got under way with a general session at which Wisconsin Chapter President R. J. Anderson, Belle City Malleable Iron Co., Racine, Wis., presided. He introduced Dean M. O. Withey, College of Engineering, University of Wisconsin, Madison, Wis., who made the opening address. The dean spoke on co-operation between the university and industry, and how working through technical organizations, such as the AFA, mutual interest can be furthered.

Following the address, A. B. Segur, A. B. Segur & Co., Oak Park, Ill., spoke on "Time-Motion Analysis—Foundry," and by employing several interesting demonstrations illustrated the practical application of principles expounded. David C. Zuege, Sivyer Steel Casting Co., Milwaukee, served as chairman.

Mr. Segur asserted that reducing the number of motions and increasing intelligence in performing work gives lower costs. The speaker also said that productivity in manual operation can be increased through time and motion analysis to a level which is better than when a machine is employed without trained personnel. Mr. Segur showed a table of comparative costs of molding by various plans, and in explaining it declared that in each case the company using motion-time analysis is in position to hold its old business and to compete on a comparative basis with the foundry in the next higher productive class. In his concluding remarks, the speaker emphasized that management can afford to spend time on the human machine.

"Precision Investment Casting" was discussed by Kenneth Geist, Allis-Chalmers Mfg. Co., Milwaukee, in a joint session of the pattern and technical groups. Albert Huebner, same company, was chairman, and Walter Kollmorgen, Kollmorgen Pattern Works, Milwaukee, was co-chairman.

The speaker explained in detail the technique in making the master pattern in either a soft metal mold or one of modeling clay, making the mold around the wax pattern, melting out the wax, heating the mold and pouring the casting. Mr. Geist emphasized that castings will be no more accurate than the patterns, therefore, the pattern deserves time and attention.

Second technical session followed with Walter Punko, Wehr Steel Co., as chairman, and R. E. Morey, Naval Research Laboratory, Washington, as the speaker. He described the development of a single molding sand for producing ferrous and nonferrous castings on Navy repair ships. It is composed of a washed silica sand of 80 fineness, 3 per cent bentonite, 0.2 per cent corn flour and 1.3 per cent dextrine. Water content for green sand facing is 3.0 to 3.5 per cent; air dried facing 3.4 to 4.0 per cent; dry sand facing 4.5 to 5.0 per cent and all backing sand 2.5 to 3.0 per cent.

Concluding technical session was held Friday afternoon with Bradley H. Booth, Carpenter Bros. Inc., in the chair. Speaker was George R. Gardner, Aluminum Co. of America, Cleveland, who discussed "Use of Statistical Control in the Foundry." He described the methods of developing statistical information and how the latter can be applied.

Opening session on gray iron was held Thursday afternoon with George P. Antonic, Walter Gerlinger Inc., as chairman. J. A. Gitzen, Delta Oil Products Co., Milwaukee, spoke on "Low and High Temperature Properties of Core and Molding Sand Binders," pointing out that for best results a careful selection must be made of the raw materials—sand, binder and moisture content. Liquid binders require clean sand while dry binders are not affected so much. A sand on the three screen sizes 70, 100 and 140 mesh packs closely together and prevents penetration. Clay, bentonite and iron oxide are high temperature binders while organic binders such as cereal, core oil, pitch, resin are low temperature binders. In the discussion it was mentioned that a core mix prepared without water gives a much smoother casting surface.

Chairmen for the Wisconsin Regional Foundry Conference included, left to right: Arthur C. Haack, Wisconsin Grey Iron Foundry Co., co-chairman; Robert C. Woodward, Bucyrus-Erie Co., general chairman; Walter W. Edens, Badger Brass & Aluminum Foundry Co., general program chairman, and John Bing, A. P. Green Fire Brick Co., publicity chairman. (*Milwaukee Journal* photo)

At the second gray iron session, Prof. W. J. Reagan, Pennsylvania State College, State College, Pa., presented a paper on "Use of Large Sizes of Anthracite in Cupola Operation." Chairman was John V. Olle, Motor Casting Co., West Allis, Wis. Prof. Reagan described operation of cupolas in the plant of Elmira Foundry Co. Inc., Elmira, N. Y., serving permanent mold production. The cupolas operate 7½ hours per day and are tapping continuously. Metal delivered from a 30-in. cupola is from 2.2 to 2.5 tons per hour. Temperature of the iron is measured by a thermocouple in the well in the spout. Molds are poured on a circular pouring table revolving about 100 times in 7½ hours.

Use Anthracite Coal

Fuel ratio 8 to 1, using 80 per cent anthracite in the charge of a size 3 to 4 in., and increased blast is employed. Prof. Reagan said there was a tendency for both scrap and anthracite to pack—anthracite produces less voids than coke. Increasing limestone from 12 to 17 lb yielded more slag, and appeared to give better cupola operations; however, no positive statement on this can be made as yet.

Third gray iron session was held jointly with the technical group under the direction of Kenneth Geist, Allis-Chalmers Mfg. Co. Clyde A. Sanders, American Colloid Co., Chicago, discussed "Sand Grain Distribution," and indicated that molding sands with a grain distribution over five or six adjacent screens are more foolproof than the customary three-screen sand. Blending of a 50 to 60 fineness sand with a 90 to 140 fineness sand will give good distribution, for example.

At the fourth and last gray iron session, R. G. McElwee, Vanadium Corp. of America, Detroit, presented a discussion on "What Do You Know About New Materials and Methods of Production." Harold Sohner, metallurgist, International Harvester Co., Milwaukee, was chairman.

There are no magical materials or methods that will work miracles, Mr. McElwee emphasized. The situation currently is aggravated by materials shortages and inferior quality. Cupola operators who get higher than average output call it a freak. The speaker disagreed with this explanation and suggested it might be wise to ascertain what was responsible, in the hope of duplicating the performance. Furthermore, why cannot one operator do as well as the shop across the street?

Mr. McElwee stated that in the future coke will have lower carbon and higher ash. The situation is the same as regards other raw materials. To make the most of this unfavorable situation requires that cupola operators compare notes and arrive at what seems to be the most efficient utilization of materials available.

Some of the Wisconsin Conference technical session speakers and chairmen. (Photos by John Bing, A. P. Green Fire Brick Co., Milwaukee)

At the first malleable iron session, under the chairmanship of Frank Harris, Belle City Malleable Iron Co., J. A. Claussen, American Iron & Steel Institute, discussed prospects for raw materials for malleable iron. Discussion covered steel and malleable scrap, coal, coke and pig iron. In addition to several other reasons coke oven operators who formerly secured all their coal from a few mines, now have to seek many sources of supply and cannot depend on uniform quality.

Losses in hot metal production largely are caused by poor quality coking coal, and scarcity and poor quality of scrap of blast furnace grade. Last year some furnaces reported increase in coke consumption ranging from 2 to 9 per cent. Ash and sulphur content has risen, and mechanical quality of coke has deteriorated. Additional limestone has been

required to keep the furnace clean.

On the subject of scrap the speaker quoted from a letter written by E. C. Barringer, executive vice president, Institute of Scrap Iron & Steel:

"Looking into 1948 as a whole I feel moderately encouraged over the matter of scrap supply. Apparently we can count that about 12 per cent of the weight of finished steel will come back as factory or industrial scrap. The railroads apparently generated 4,000,000 gross tons of scrap in 1947. The same tonnage may be anticipated in 1948. Strictly dealer scrap should show some improvement. This scrap largely is the product of obsolescence. Ship breaking, yielding about 75,000 tons a months, is about at the maximum.

"Return of much heavy scrap from Europe is dubious, and a certain amount of doubt prevails, in regard to scrap from China and other Pacific areas. At the moment the scrap situation is pretty tight. However, any change should be on the side of an increase. But this increase will not be adequate for several years. Barring a complete collapse of business, an old-fashioned buyer market is not in sight for several years."

The second session was devoted t a round-table discussion on malleabl annealing cycles in batch type ovens. C. M. Lewis, Badger Malleable & Mfg. Co., led the discussion and Emil Hansen, Wisconsin Appleton Co., serve as chairman.

At the third malleable iron session, under the joint chairmanship of Steve Pohl, Federal Malleable & Mfg. Co., and Carl Grobschmidt, Badger Malleable & Mfg. Co., the design and operation of the Cole recirculating annealing oven was described by R. N. Cole, Canton Malleable Iron Co. Refractory practice and construction of this type oven was described and illustrated by a number of slides presented by R. A. Witchey, A. P. Green Fire Brick Co. One of the features was the adoption of flat arch construction which lends itself to easy and economical mantenance.

Describes Oven Construction

The ovens were constructed of 13½-in. insulating fire brick walls covered on the outside with a thin coating of plastic insulation. The roof is a 9-in. insulating fire brick flat arch covered with a thin coating of plastic insulation and a 2-in. coating of loose insulation. Floor construction consists of an 8-in. bed of slag concrete on which was laid a flat 2½-in. course of 2300° F insulating fire brick, 4-in. refractory castable and 4½-in. intermediate quality hard burned fire brick laid in rowlock courses.

An interesting paper, "Incentive Inducements for Men To Work in Malleable Foundries," was presented by H. R. Williams, Williams Management Engineering Co., at the final malleable iron session. Chairman was B. K. Capinski, Milwaukee Malleable & Gray Iron Works; co-chairman Martin Harder, Lakeside Malleable Castings Co. The speaker touched upon a long list of gripes, real and imaginary, which prevent men from seeking employment in malleable iron foundries, and which prevented existing employees from being satisfied with conditions. In the speaker's opinion, a clean shop, good equipment, a just and equitable wage system based on intelligently collected data, and a realization on the part of men and management that they are joint partners, will convert any foundry into a good place to work.

At the first nonferrous session, presided over by John Kammermeyer, Federated Metals Division, American Smelting & Refining Co., and Carl Van Buren, Allis-Chalmers Mfg. Co., the subject of proper selection of alloys was discussed in an exceptional-

(*Continued on page* 218)

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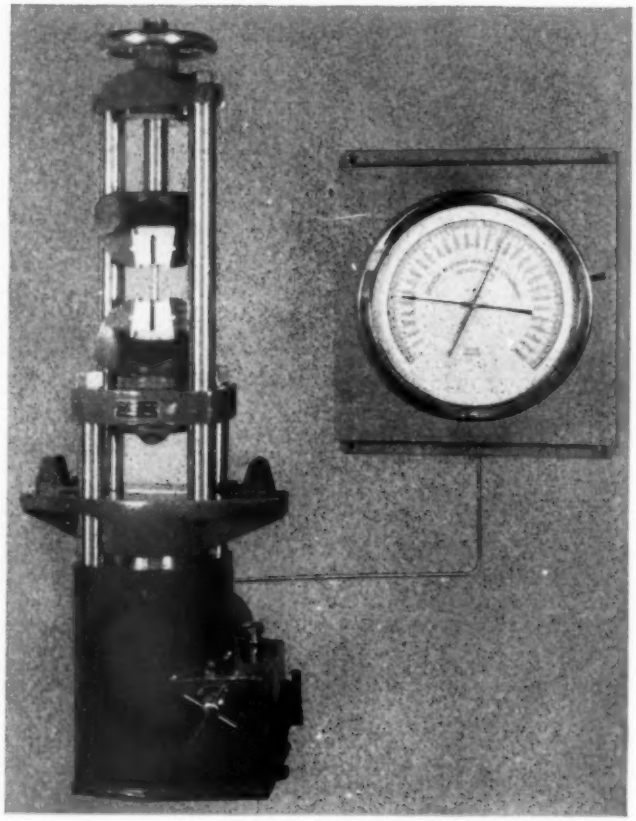

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Pangborn equipment corrects problem impairing workers' efficiency, slowing down production. In addition, rings up indirect savings of 25%. Negligible operating and maintenance costs prove PANGBORN a good investment.

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CASE 3472

PROBLEM: *Foundry and machine dust*

Savings in salvage and increased efficiency of workers convince this user that the installation of 20 Pangborn collectors was a good investment.

The hungry, profit-consuming "Dust Hog of Industry" always takes the count when he meets up with PANGBORN Dust Control Equipment. The cases shown here are typical examples. PANGBORN has enabled these plants to turn their dust losses into profits, through salvage of waste materials and increased efficiency of workers with better working conditions.

These are just four cases picked out of a survey among PANGBORN users. A substantial percentage of those users surveyed said their systems were practically paying for themselves in direct reclamation of dust by-products.

A PANGBORN "Dust Pocket Survey" of your plant by experienced PANGBORN engineers *at no cost to you* may reveal similar opportunities to turn dust losses into profits. For complete information on Pangborn Dust Control Equipment, write for Bulletin 909A.

PANGBORN CORPORATION, 300 Pangborn Blvd., Hagerstown, Md.

Pangborn DUST CONTROL

Turns Dust Losses Into Profits

(*Continued from page* 216)

ly comprehensive manner by William Romanoff, H. Kramer Co. The speaker directed attention to the fact that ingot or secondary metal is prepared under the strictest metallurgical control, something that is not always possible where the foundryman attempts to make his own mixtures from virgin metal. He described furnaces and furnace practice and stressed the importance of controlling temperature and flame characteristics. In discussing the advantages and disadvantages of covering the metal in the crucible with charcoal, glass or other material, he referred to certain archaic ideas and practices that still prevail, especially among the older foundrymen.

Occasionally surface inclusions of slag or sand give the machine shop a chance to complain about hard brass or bronze. The value and accuracy of this claim was discounted in a typical experiment where three castings were poured from a single heat. The machine shop report indicated that from a machining standpoint, one casting was much superior to the two from the other classification.

Under the title "Are You Going Broke?" J. Kruyne, vice president, Marshall & Ilsley Bank, presented an analysis of present industrial conditions, causes and remedies for certain policies and practices, supplemented by a peep into the future, and a reference into the part played by the banks in maintaining the business ship on an even keel. All signs and portents indicate a business recession in the near future. The speaker urged his hearers to apply thinking to the business situation in which they are involved. This will prevent the frantic panicky last minute moves when the storm is under way.

Avoid Metal Turbulence

Typical foundry problems in casting aluminum alloys were described and illustrated by Ray Quadt, Federated metals Division, American Smelting & Refining Co., at the third nonferrous session Friday under the joint chairmanship of A. R. Tooman, Racine Aluminum & Brass Foundry, and L. J. Andres, Lawran Foundry Co. The speaker emphasized the importance of avoiding turbulence of metal at any stage between furnace and mold, or in the mold. Where the metal is decanted from a high furnace, the pouring ladle or crucible should be held up close to the spout. In pouring the casting the crucible lip should be close to the pouring basin or sprue opening. Avoid stirring the metal with rod or skimmer. To prevent iron pickup, the melting pots should be emptied and a fresh coating applied every 8 hours.

Attention was directed to poorly designed gates and risers responsible for surface shrinkage, hot sand surfaces, and shrinks at gate. Other defects are based on hard ramming, inadequate venting and low sand permeability. On the subject of permanent molds, the major causes of defective castings are poor mold design, and the insufficient understanding of the need for, and the methods of obtaining directional solidification.

Numerous questions were asked at the nonferrous quiz program Friday afternoon. G. K. Dreher, Foundry Educational Foundation, served as moderator at this session. Panel of experts included A. K. Higgins, Allis-Chalmers Mfg. Co.; A. Schott, Standard Brass Works; Earl Woodliff, Foundry Sand Service Engineering Co., and N. Todoroff, Crane Co. C. Kotowicz, Ampco Metal Co. was chairman.

Four sessions were devoted to problems relating to steel castings. The first one was under the direction of Harold A. Ziebell, Crucible Steel

(*Continued on page* 220)

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Sand Prepared To Your Requirements

SANDCUTTER conditions the sand in accordance with individual requirements for moisture, bond and permeability. Sand conditioned by a Sandcutter riddles fast, rams easily and vents perfectly.

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Sandcutters

(*Continued from page* 218)

Casting Corp., and S. E. Mueller, Falk Corp., with Howard F. Taylor, Massachusetts Institute of Technology, the speaker. Discussion was on "Steel Foundry Sands and Their Relation to Casting Defects," and Mr. Taylor pointed out that improper gating, for example may lead to trouble attributed to sand. Too much metal running through a gate may affect the sand adversely at that point, and turbulence tends to pick up sand as well as to entrain gases and slag.

As for the sand itself, grain size and distribution and chemical composition are important factors. Completely new sand facing causes less difficulty in producing satisfactory castings, and using old sand as a facing is not good practice. Minimum amount of gas-forming elements should be added to the sand. Bentonite-bonded sands give higher green strength and dry strength, but the surface is difficult to patch once it is dry due to slow migration of moisture. It is possible to mix natural sand and bentonite bonded sand to obtain better migration properties.

By proper grain distribution it is possible to prevent metal penetration but carried to the ultimate, the permeability becomes nil. Hence, the usual practice is to have the maximum quantity on two or three adjacent screens, and today an 80-grain size is common in steel foundries. Time that the sand is in contact with heat also is a factor. For example a cylinder poured and dumped in 30 sec was impossible to clean but when left in the sand 3 minutes it peeled beautifully. Apparently the job is to control the amount of fusion that takes place on the surface. Iron oxide is being used to prevent penetration and eliminate fins.

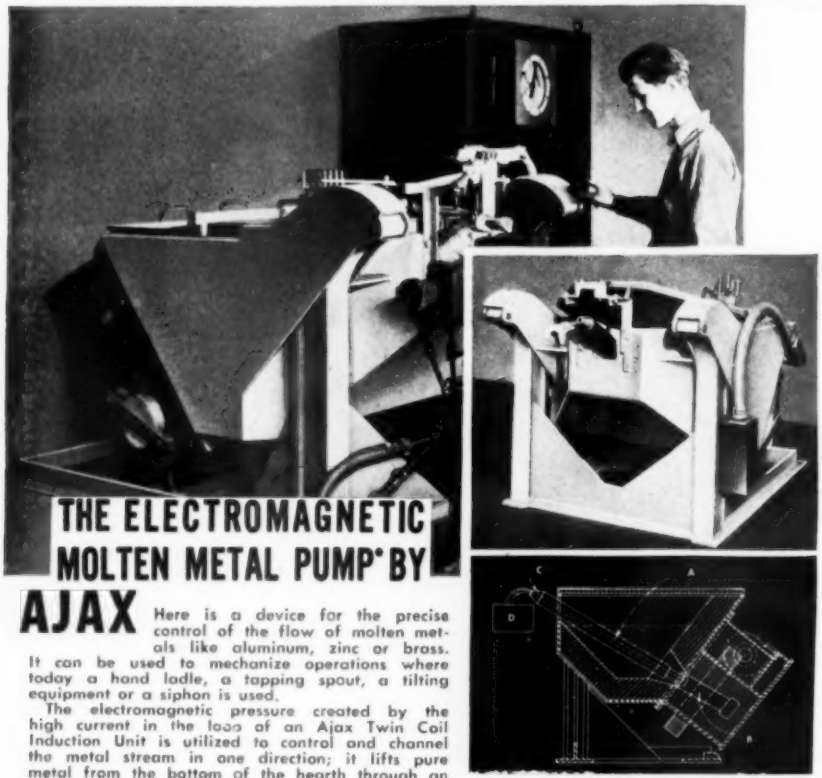
Discuss Use of Oxygen

At a following session with Dr. George V. Slottman, Air Reduction Sales Co., as speaker, and O. H. Kraft, Bucyrus-Erie Co. and E. Schneider, Milwaukee Steel Casting Division, Grede Foundries Inc., as chairmen, "Use of Oxygen in the Open Hearth and Electric Furnace" was discussed. According to the speaker use of oxygen to remove carbon from the bath is a time saver, reducing time for heats and increasing production from the same furnace. Oxygen also can be used to hasten melting of the charge.

Oxygen can be introduced in a specially constructed burner or with a lance into the bath. In the latter case the diameter of the pipe should be such that the velocity and amount of oxygen entering the bath will keep it from being consumed too rapidly. When using a burner with enriched oxygen-air the open hearth roof must be watched carefully. In the electric furnace it may be advisable to remove the roof and substitute a chimney; saving the roof from damage and providing a means to carry off the fumes.

Friday morning's steel session was under the direction of Stevens Lukacek, Wehr Steel Co. and V. E. Ziemer, Maynard Electric Steel Casting Co., and comprised a round-table discussion on developments in gating and risering, with Howard F. Taylor as discussion leader. Use of neckdown cores on risers saves money and is responsible for higher production of castings than otherwise would be possible. While segregation was found in some cases, it was eliminated by increasing the size of the neck or opening. Chills aid in directional solidification, and have the advantage that no machining is required at areas where they are used. Chills should be made to fit the contour of the casting at the point of use; one foundry has a department for that purpose. Exothermic material in the riser must

A *New* NON MECHANICAL METHOD FOR CONTROLLED PUMPING OF MOLTEN METAL



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Castings ranging from ¼ lb. to 30 lbs. or more can be poured in endless repetition with good accuracy in weight. Special problems requiring a continuous flow of hundreds of pounds per minute can be handled by the same unit. The electromagnetic pump is also a molten metal reservoir maintaining metal temperature accurately.

The large photo shows the Ajax Tama Electro-magnetic Pump at work. Control cubicle in rear maintains temperature, energizes pump from electric timer, electric eye, or similar devices. Second photo is a close-up of the pumping unit. Below is a cross section of unit showing discharge pipe (A), induction channel where pressure is created (B), pouring spout (C), and mold (D).

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AJAX ELECTRIC FURNACE CORP., Ajax Wyatt Induction Furnaces for Melting

produce heat in the vicinity of the connection of casting and riser neck to function properly.

The final steel session was devoted to "Hot Tear Formation," with Charles W. Briggs, Steel Founders' Society of America, as speaker, and S. E. Mueller, Falk Corp. and George Jedinak, Sivyer Steel Casting Co., as chairmen. Mr. Briggs said that prevention of internal and external tears may be accomplished by keeping mold and core contraction stresses low; by proper design of castings so that large temperature gradients are not present; elimination of hot spots; use of ribs or cracking strips; correct feeding of castings and production of steel of low inclusion content and of proper inclusion type.

"Pattern Purchasing" was the theme of the second pattern session, with two speakers sharing time, namely, Gilbert Hartman, Milwaukee Flush Valve Co., Milwaukee, and M. C. Frankard, Delta Mfg. Co., Milwaukee. Harry Arneson, Spring City Pattern Works, Waukesha, Wis., was chairman, and Leonard Gratz, G & O Pattern Works, Milwaukee, was co-chairman.

Mr. Frankard commented on the desirability of standardizing the purchase of patterns so that quotations will be based on the same specifications. He mentioned that the "Pattern Manual" now under preparation by the AFA and to be available soon will be a big help toward this goal. A pattern purchaser should have a pattern engineer to handle or supervise purchasing.

Write Pattern Specifications

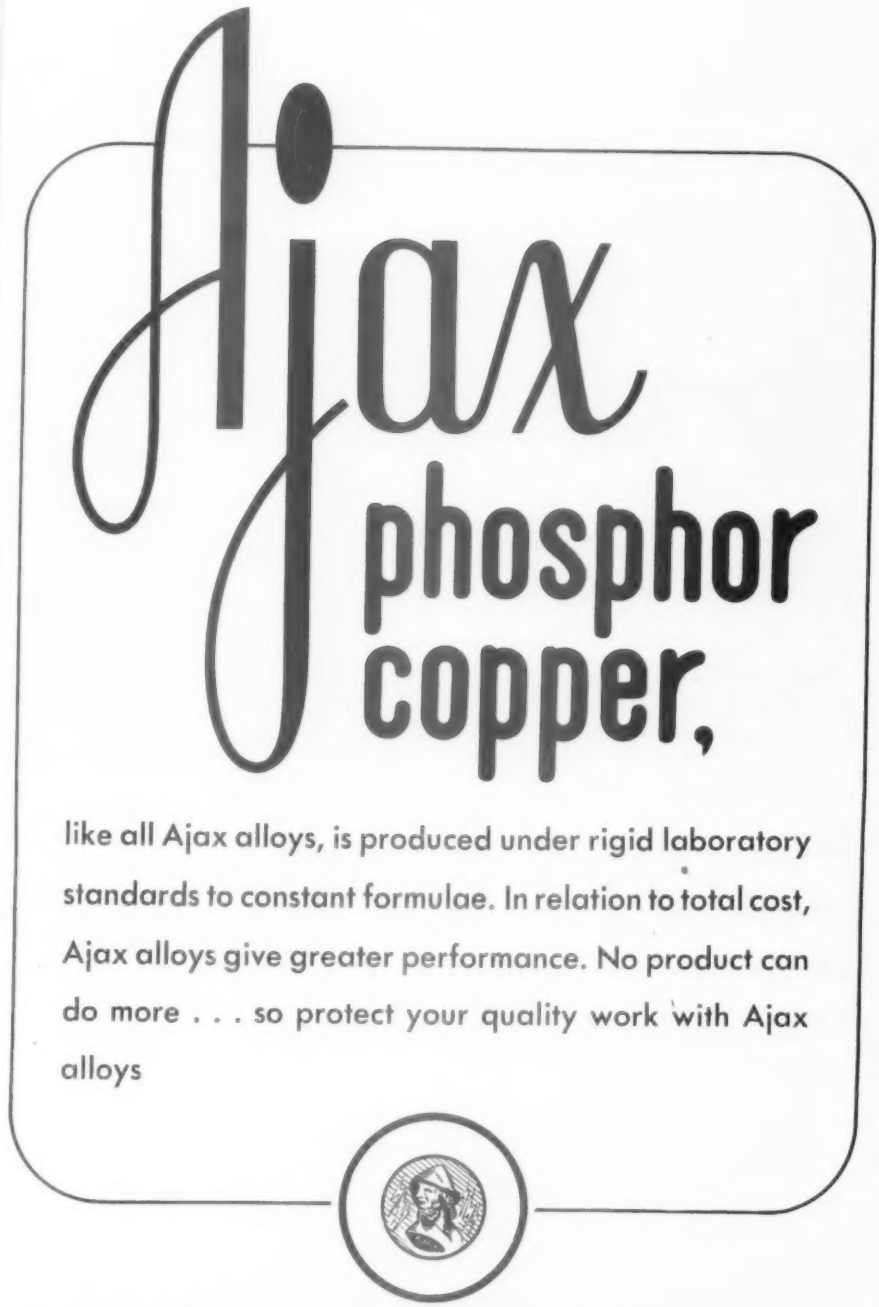
Mr. Hartman said that for best results the buyer of a pattern should write his specifications in co-operation with the design engineer to eliminate troublesome features as well as consult with the foundryman and patternmaker. He then discussed some of the factors on which to predicate the material from which the pattern should be made, such as the number of castings to be made, etc.

Third session on patterns was prefaced with a March-of-Time movie on "Trees for Tomorrow," a subject which is of considerable interest to every patternmaker. Experience of World War II demonstrated that supply of quality lumber for patterns can be critical. Following the movie, H. J. Wade, Fairbanks, Morse & Co., Beloit, Wis., Gilbert Krueger, Allis-Chalmers Mfg. Co., Milwaukee, and A. M. Fischer, Charles Jurack Co., Milwaukee, contributed to a discussion on "Unusual Patterns." Walter Kollmorgen, Kollmorgen Pattern Works, Milwaukee, was chairman, and Albert Huebner, Allis-Chalmers Mfg. Co., Milwaukee, served as co-chairman.

Much of the discussion centered around the use of models; in fact, Mr. Wade's prepared comments were titled "The Scale Model as a Manufacturing Aid." It was pointed out that from models patternmakers and foundrymen can visualize the finished casting, best molding procedure and how the patterns and core boxes should be made in keeping with the procedure. Advocates of models claim money can be saved.

A number of large companies have pattern engineering committees, whose responsibility it is to figure out the best technique before jobs are started. It was also pointed out that models eliminate some product redesign. They also suggest where designs can be improved to the benefit of product appearance as well as manufacturing procedure.

Use of models also was discussed by A. F. Pfeiffer, Allis-Chalmers Mfg. Co., at the last pattern session. He pointed out that models help to reduce costs particularly on intricate parts. After a complicated job is executed in his plant, Mr. Pfeiffer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like all Ajax alloys, is produced under rigid laboratory standards to constant formulae. In relation to total cost, Ajax alloys give greater performance. No product can do more . . . so protect your quality work with Ajax alloys
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ASSOCIATE COMPANIES: AJAX ELECTRIC • AJAX ELECTROTHERMIC CORP. • AJAX ELECTRIC FURNACE • AJAX ENGINEERING

explained that sketches are made of the method used and these are filed for future reference. In addition, photos of pattern equipment are taken and these are filed for the same purpose. This simplifies duplicating a job at some future time, or suggests adaptation to a similar job.

B & B Foundry, Indianapolis, recently acquired by Muncie Aluminum Foundry, Muncie, Ind., is being operated as a subsidiary of the Indianapolis company, producing aluminum and brass castings.

TECHNICAL PROGRAM FOR AFA CONGRESS

(*Continued from page* 100)

Magnesium Alloys," by H. E. Elliot, Dow Chemical Co., Bay City; "A Study of Factors Affecting the Pouring Rates of Castings," by H. E. Elliot, and J. G. Mezoff of Saginaw Bay Industries, Bay City; "Development of a Permanent Mold for Aluminum and Magnesium Test Bars," by L. J. Ebert, G. Sachs and R. E. Spears, Case Institute of Technology; "Effect of Titanium on Grain Size and Mechanical Properties of No. 195 Aluminum Casting Alloys," by W. E. Sicha and R. C. Boehm, Aluminum Co. of America, Cleveland; "Can Castings be Engineered?" by F. G. Tatnall, Baldwin Locomotive Works, Eddystone, Pa.

George P. Halliwell, director of research for H. Kramer & Co., Chicago, Brass and Bronze—"A New Permeable Metal Casting Plaster," by E. S. Johnson and K. A. Miericke, U. S. Gypsum Co., Chicago; "The Effect of Foundry Practice on Properties of Some Binary Copper-Silicon Alloys," by A. I. Krynitsky, W. P. Saunders and R. Sterm, National Bureau of Standards, Washington, "The Technology of Copper-Lead Alloys," by R. W. K. Honeycomb, Melbourne, Australia, the exchange paper of the Institute of Australian Foundrymen.

Program Covers Wide Range

V. A. Crosby, Detroit district representative in charge of sales, service and development for Climax Molybdenum Co., Gray Iron—a symposium on heat treatment, covering fundamentals, hardening by air quenching, stress relief and martempering; authors, respectively, Alfred Boyles of U. S. Pipe & Foundry Co., Burlington, N. J.; R. A. Flinn, American Brake Shoe Co., Mahwah, N. J.; J. H. Schaum, National Bureau of Standards, Washington, and G. Lahr, General Motors Corp., Detroit.

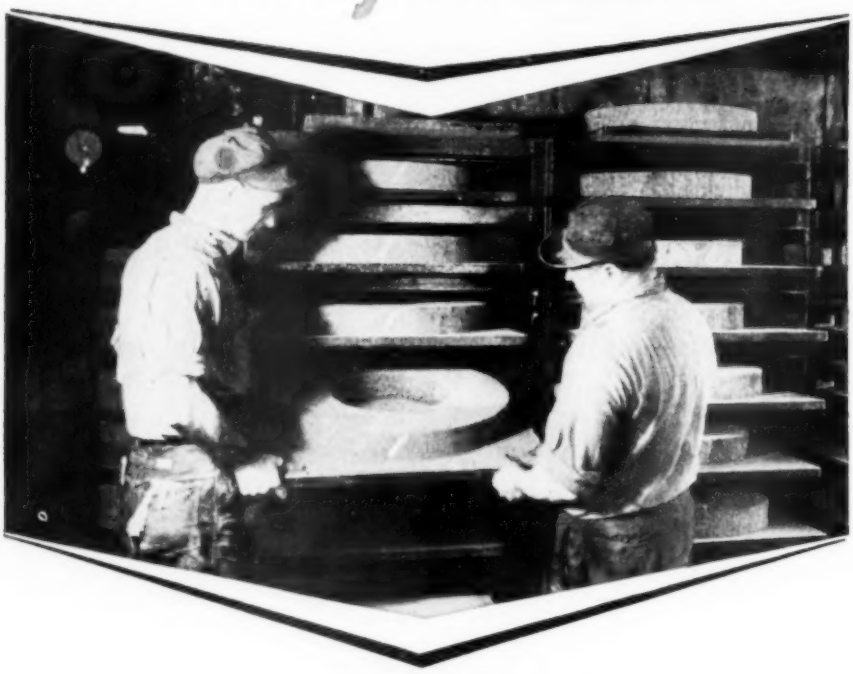
Also "A Laboratory Evaluation of Some Automotive Cast Irons," by A. B. Shuck, American Hammered Piston Ring Div., Koppers Co., Baltimore; "A Suggested Method for the Determination of Coke Reactivity to CO_2 at Combustion Temperatures," by H. E. Flanders, University of Utah, Salt Lake City; "Production of Nodular Graphite Structure in Gray Cast Iron," by H. Morrogh, British Cast Iron Research Association.

William B. McFerrin, Detroit district service manager for Electro Metallurgical Co., Malleable—"Effect of Common Alloying Elements on Tensile Properties of Malleable Iron," by W. K. Bock and Dr. Harry A. Schwartz, National Malleable & Steel Castings Co.; "Pearlitic Malleable Irons, Plain and Alloyed," by Prof. Richard Schneidewind, University of Michigan, Ann Arbor.

Peter E. Kyle, professor of metallurgy, Cornell University, Ithaca, N. Y., Sand—"Surface Pressure of Molding Sands and Core Sands," by F. S. Brewster, H. W. Dietert and H. H. Fairfield, Harry W. Dietert Co., Detroit; "Causes of Rat-Tail

(*Concluded on page* 224)

"I do the job faster..."



Transite Core Plates offer all these advantages:

They speed production—Core makers save trips . . . handle many plates at one time.

They last longer—Made of fibrous asbestos and cement, Transite Core Plates resist shock . . . are less likely to crack or break.

They clean easily—Core wash, sand, etc., do not stick as readily as to other materials. Both sides are usable.

They resist corrosion and warpage—Transite Core Plate surfaces stay smooth even after long service. Warpage is less than 0.1%.

They are economical—Low price, low maintenance and long life add up to low costs.

To eliminate green cores and reduce baking time perforated plates are also available.

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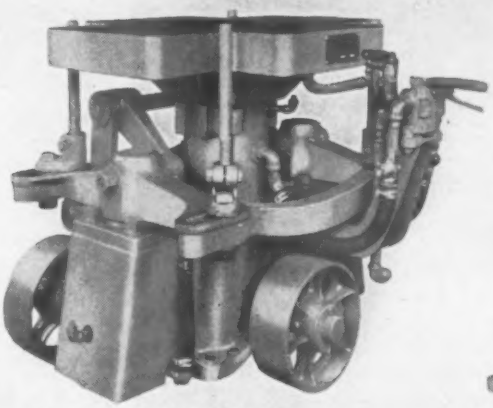
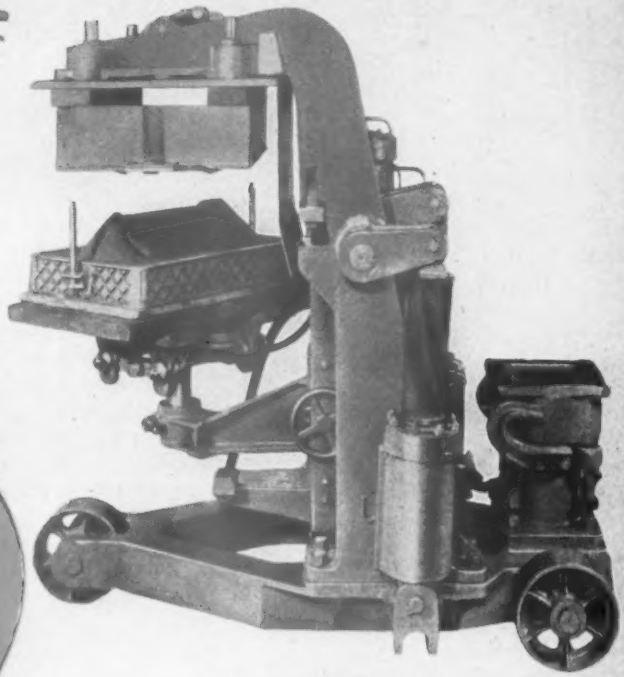
TRANSITE CORE PLATES MADE OF ASBESTOS



No. 681-C
Portable Jolt Stripper



No. 612 Portable
Jolt Roll-Over Pattern Draw

Pace Setters

● Speed up your production and keep competitive with Johnston & Jennings molding machines. The No. 681-C jolt stripper pictured above—furnished portable or stationary—features a valve-less, shock-less, jolt free from rebound, a positive draw, speed of which is variable to meet different conditions,—and complete enclosure of all working parts, thus assuring years of efficient trouble-free service.

The No. 612 Portable Jolt Roll-Over is designed specially for work requiring absolute accuracy in ramming and drawing. It is ideally used for making the intricate cores and molds required in aircraft and other precision industries. Use of two roll-over cylinders and oil dash pot control assures smooth uniform operation. "J & J" has just the machine you need.

See the complete line of J & J machines
Booth No. 821—Philadelphia, May 3rd to 7th.

A COMPLETE LINE PROVEN IN SERVICE INCLUDING—

PLAIN AIR JOLTS
in 12 different sizes

JOLT SQUEEZERS
fast sturdy machines—3 sizes

JOLT STRIPPING PLATES
4 sizes ranging up to 16" draw

JOLT, SQUEEZE, STRIPPING PLATE AND PATTERN DRAWS
Popular for medium service —2 sizes

PORTABLE JOLT ROLL-OVER AND PATTERN DRAW
A heavy duty thoroughly dependable machine—portable

JOLT ROLL-OVER AND PATTERN DRAWS
Fast large capacity machines with roll-out conveyors—4 sizes

Write for fully descriptive catalog giving complete specifications.

THE JOHNSTON & JENNINGS CO.

867 Addison Road • Cleveland 14, Ohio

IMPROVED UP-TO-THE-MINUTE MOLDING MACHINES FOR EVERY NEED

(*Concluded from page* 222)

Casting Defects," report of the division committee on physical properties of iron foundry molding materials as elevated temperatures. This group will also have at the convention the extensive display of castings exhibiting the defect, prepared during its long investigation.

Charles Locke, chief metallurgist-general superintendent, West Michigan Steel Foundry Co., Muskegon, Steel—"Quality Welding of Plain Carbon Steel Castings," by E. L. LaGrelius and J. D. Wozny, American Steel Foundries, East Chicago, Ind., "Observations on Knock-Off Risers as Applied to Steel Castings," by S. W. Brinson and J. A. Duma, Norfolk Naval Shipyard, Portsmouth, Va.; "Electro-Chemical Cleaning of Large Steel Castings—An Experiment," by John A. Wettergreen, General Electric Co., Schenectady, N. Y.

Recruiting and Training Personnel

Alfred W. Gregg, executive engineer, Whiting Corp., Harvey, Ill., Educational Division — "Engineering Education for the Foundry Industry," by George K. Dreher, technical director of the Foundry Educational Foundation, Cleveland. The paper will be presented at the Monday morning session, which will also feature a question-and-answer program on recruiting and training of personnel for foundry firms.

Foundry mechanization will be the topic at the meeting of the Plant and Plant Equipment Committee, Monday evening, with innovations particularly applicable to small plants under consideration. Lester B. Knight of Lester B. Knight & Associates, Chicago, will be featured speaker on "Modernization of the 'Small' Plant."

Division programs have been organized, as in the past several years, in such manner that delegates will be able to attend the meetings relating to their particular field of interest in the minimum number of days.

Sessions of the Aluminum and Magnesium, Brass and Bronze, Educational, and Malleable divisions will be held Monday and Tuesday, May 3rd and 4th; those of the Pattern group Tuesday and Wednesday; Sand, Wednesday and Thursday; Gray Iron, Steel, Thursday and Friday.

The Engineering School Graduates Luncheon, sponsored by the Educational Division, is scheduled for Wednesday, May 5. Shop courses of the gray iron and sand group will be held at 8 p. m., Monday through Thursday. As in the past, the popular, informal courses will be presented at the evening hour in order to permit the attendance of local plant men who may be interested.

Delegates will have access to the exhibit halls from 9 a.m. until 5:30 p.m. Monday and Thursday and until 9 p.m. Tuesday, "Philadelphia Day." Wednesday, when AFA's annual business meeting will be held, exhibit halls will open at 11 a.m. and close at 5:30. They will be open 9 a.m., Friday.

British Foundry College Is Opened

National Foundry College has been established at Wolverhampton and Staffordshire Technical College, Wolverhampton, Staffordshire, England. Efforts have been made to re-establish the full-time diploma course which was the main feature of the predecessor of the college, the British Foundry School, during 1935-1939.

The course covers the whole foundry industry, ferrous and nonferrous, and the diplomas awarded to successful students will be endorsed by the Ministry of Education. Admission requirements are a minimum of one year's practical experience in at least one branch of the industry, together with higher National Certificate, or a university degree, preferably in metallurgy or engineering, or a grade of membership obtained by examination of a professional institution in engineering, metallurgy or chemistry.

J. Bamford, who was in charge of the British Foundry School, has been appointed head of the college.

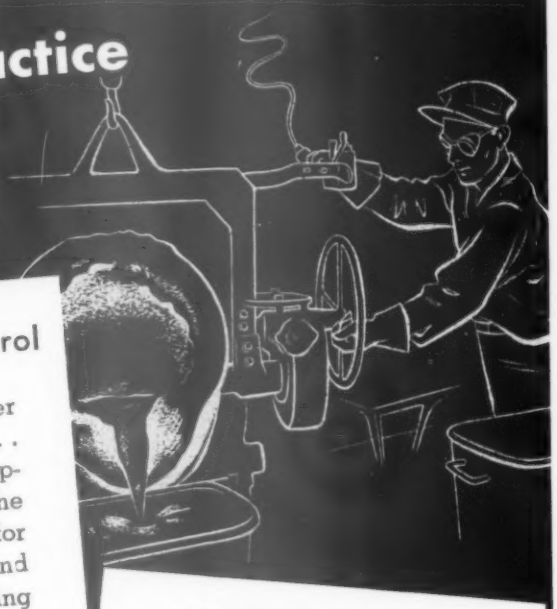
Italians To Study Metallurgy

Second national meeting of Associazione Italiana di Metallurgia (AIM) will be held in Milan on April 23 to 25. One day of the meeting will be devoted to discussion of papers on corrosion, and aging of metals. Other two days will be open for presentation of papers on other phases of metallurgy. Address of the society is Via S. Paolo 10, Milan, Italy.

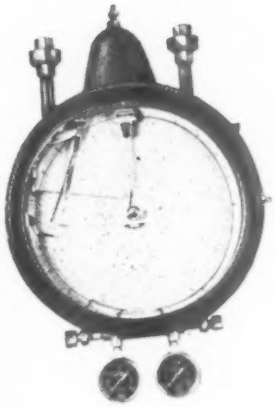
Aluminum Movie

Said to be the first color motion picture to show the production of aluminum from raw bauxite to finished products, "Pigs and Progress" is offered for loan by the advertising department, Reynolds Metals Co., 2000 South Ninth St., Louisville 1. Commentary explaining each of the scenes and processes in the 16-mm film is by Andre Baruch, radio announcer.

Progressive Foundry Practice Includes These Aids to GREATER EFFICIENCY . . .



• FOXBORO Air-Weight Control



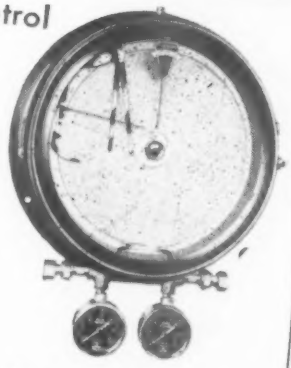
Installed on your present blower . . . whatever the make or type . . . this exclusive Foxboro development will correctly control the blast, properly compensate for varying weather conditions, and make *every day* a good pouring day. Hundreds of leading foundries rely on Foxboro Air-Weight Control, reporting such advantages as better and more uniform quality, fewer rejects, less pigging, fuel saving, greater output, smoother operation.

• FOXBORO Wind-Box Pressure Recorder

With this simple, sturdily constructed Foxboro Instrument, you can keep a continuous, close check on operating conditions in the cupola. It will show up any restriction to the blast such as "arching" of the charge, which interferes with proper melting. Its dependable accuracy, and trouble-free performance, are typical of all Foxboro better-engineered instruments.

• FOXBORO Core-Oven Control

Either one of the widely-used instruments will give you continuous, accurate control of temperatures in core ovens. Each assures consistent production of uniform cores and a reduction of baking time to a minimum.



The top controller, of the filled-system type, is either air-operated (as shown) or electrically (Rotax) operated. Provides a continuous record. Bottom instrument is one of the most popular and finest electric operated potentiometer controllers ever produced.

WRITE for complete information on Foxboro Control Systems developed specifically for Foundries. **The Foxboro Company, 32 Neponset Ave., Foxboro, Mass., U. S. A.**

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RECORDING · CONTROLLING · INDICATING
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Industry BRIEFS

METAL & Alloy Specialties Co. Inc., 1875 Elmwood Ave., Buffalo, has been acquired by Joseph P. Bauer and Lester Benson, former aircraft industry executives, through purchase of stock from the estate of the late Thomas S. Hemenway, founder of the 31-year-old aluminum and brass foundry, and from his widow, Mrs. Sarah Hemenway. The latter continues as a director, with Mr. Bauer as president and Mr. Benson vice president and treasurer.

* * *

Hewitt-Robins Inc., Buffalo, has leased a warehouse at 1010 Pennsylvania Ave., Charleston, W. Va., to stock products for Robins Conveyors Division, Passaic, N. J., for shipment to all parts of the South. The Charleston office will be located at the new warehouse. Joseph W. Wantling is manager of that area for Robins Conveyors Division, and Nelson Reinhold for Hewitt Rubber Division. The Galigher Co., Salt Lake City, Utah, has been appointed representative of Robins Conveyors Division, for Utah, parts of Idaho, Montana, Nevada and Wyoming. A new sales office recently opened for Robins Conveyors Division, at Kansas City, is headed by C. Boyd Goodhart.

* * *

L. D. Harkrider, president, General Aluminum & Gray Iron Foundry Division, General Malleable Corp., 706 East Main St., Waukesha, Wis., has been awarded the presidential certificate of merit for "outstanding fidelity and meritorious conduct" in the war effort.

* * *

Davies & Thomas Co., Tenth & Union Sts., Catasauqua, Pa., has been taken over by other interests and will be known as Davies & Thomas Inc. James T. Duffy Jr., business counselor and former president of Read Machinery Co. Inc., Catasauqua, becomes chairman of the board and treasurer. Norman Esibill is president; Herbert Cohen secretary, and Fred Walker, comptroller.

* * *

Milwaukee Chaplet & Mfg. Co., 1025 South 40th St., Milwaukee 4, has changed the name of its Machinery Mfg. Division to Rice Pump & Machine Co., which will continue to operate as a division of the parent company. R. D. Houghton continues as general manager and sales manager of Rice Pump & Machine Co.

* * *

Mack D. Collins, City Pattern Co., 2426 St. Clair Ave., Cleveland, and Homer J. Gillam and Clayton O. Miller, partners of Pattern Permold & Casting Co., 14309 St. Clair Ave., have consolidated their companies and formed a new firm, City Pattern Co. Inc., which will be located at 2426 St. Clair Ave.

* * *

Sale of a surplus iron and steel foundry at Watervliet, N. Y., to Adirondack Foundries & Steel Inc., P. O. Box 99, Watervliet, for $257,000 has been approved by War Assets Administration. Company will spend about $270,000 to convert the property to the production of castings.

* * *

Wilson Welder & Metals Co. Inc., 60 East 42nd St., New York 17, manufacturers of arc welding machines and electrodes, has appointed Industrial Air Products Co., 3200 N. W. Yeon Ave., Portland 10, Oreg., as its exclusive electrode distributor in the state of Oregon.

* * *

Stark Pattern Inc., 1518 Eight St., Canton, O., recently incorporated to succeed the former Stark Pattern Co., has elected E. R. Daugherty president and treasurer, John R. Daugherty vice president, and Paul F. Daugherty secretary.

* * *

Federal Steel Products Corp., 415 St. Charles St., Houston 3, Tex., plans to replace one of its buildings destroyed by fire Jan. 20 with a larger fireproof structure. Damaged equipment also will be replaced. Loss was estimated at $175,000.

* * *

Pyro Clay Products Co., Oak Hill, O., has changed its name to Pyro Refractories Co. There is no change in personnel, management or products of the company.

* * *

Market Forge Co., Everett, Mass., has appointed the following as stocking distributors in their respective cities and surrounding areas: Larson Equipment Co., Buffalo; Charles

(*Concluded on page* 228)

Research Laboratory Is Completed

NEW uses for industrial gases employed in the production and finishing of steel products are among the important research activities now being conducted by Air Reduction Co. at its new apparatus research laboratory in Murray Hill, N. J.

Some 250 engineers, metallurgists, physicists, chemists, technicians, and machinists are now engaged in research and development in this laboratory which was completed in May, but did not get into full scale operations until recently when the laboratory became fully staffed and all necessary equipment had been installed.

The building is of red brick and steel and provides about 78,000 sq ft of floor space. In addition, there are two service buildings, an acetylene generator house and a combination boiler room-garage.

Another Blessed Event!

Now there are... 5 HOUGH PAYLOADERS at Gunite Foundries Corp.

SAY "HUFF"

PATENT 2,412,323

Gunite Foundries Corp., Rockford, Ill., have just added the fifth Model HA Payloader to their fleet of these husky, nimble work-horses. Gunite says their four older machines save 110 man hours a day. They deliver 400 tons of sand daily from stockpiles to more than 40 molding stations on a 200 foot average round trip . . . move 25 tons of castings and molds . . . remove used sand from molding floors for return to reclaiming mullers . . . do general clean-up work and other chores.

Payloaders can do these same jobs profitably in your foundry too — will also unload sand from boxcars, store sand, charge bins and hoppers, handle slag, coke, waste, cupola charges. They do quickly, easily, at low cost many tasks that are now slow, laborious and profit-consuming. Low in first cost, low in operating and maintenance costs, a Payloader will pay for itself in a few months. Get complete details today on the HA and larger Payloaders, also the 2-yard Payloader Buggy.

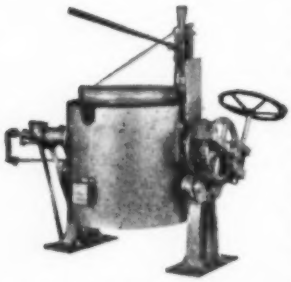
THE FRANK G. HOUGH CO.

703 Sunnyside Ave., Libertyville, Ill.

TRACTOR SHOVELS SINCE 1920

JOHNSTON

BRASS MELTING CRUCIBLE FURNACES



Write for Bulletin F-223

For melting all brasses, bronze, copper, aluminum. Tilting mechanism locks in any position. Simple, handy cover lifting mechanism operated from front of furnace. Heavy ¼" steel shell. High capacity, rapid melting. Low metal losses. Long crucible life. Low fuel cost with JOHNSTON Reverse Blast Low Pressure Burners—Oil or Gas. ALSO STATIONARY TYPE.

SAFETY THE JOHNSTON LINE DEPENDABILITY

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ENGINEERS & MANUFACTURERS OF INDUSTRIAL HEATING EQUIPMENT

PRODUCTION • MECHANIZATION • OPERATIONS • MANAGEMENT

Consulting and Engineering Service

From the Design of the Foundry to the Shipment of the Finished Castings

A Complete Cost Production and Profit Analysis.

- Plant Design and Layout
- Modernization
- Mechanization
- Centrifugal Castings
- Metallurgical Control and Standardization
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- Foundry Management Counsellors

STANDARDS—INCENTIVES—METHODS—EVALUATION.

W. G. REICHERT ENGINEERING CO.

1060 Broad St., (Industrial Bldg.) **Newark (2) New Jersey**

(Concluded from page 226)

C. Lewis Co., Springfield, Mass.; Charles A. Strelinger Co., Detroit; Mill & Factory Supply Co., and Carolina Rubber & Supply Co., of Toledo, O.; and H. E. Fortna & Brother, Reading, Pa.

* * *

Union Mfg. Co., 296 Church St., New Britain, Conn., has acquired the air chuck and air chuck cylinder business from Hannifin Corp., 621 South Kolmar Ave., Chicago, and is accepting orders for complete units and parts to be delivered from the purchased inventory or schedule for delivery upon completion of manufacture.

* * *

Brown Instrument Division, Minneapolis-Honeywell Regulator Co., has opened a branch office at 1514 East Central, Wichita, Kans., under the managership of Lynn H. Johnson Jr. Another district office was opened recently at 922 Dermon Bldg., Third and Court Sts., Memphis, Tenn.

* * *

Gorsuch Foundry Co., Jeffersonville, Ind., has been rebuilt, greatly enlarged and modernized. The new building was constructed around and over the former foundry with a minimum of interruption of production.

* * *

Charles H. Tate Co., 992 Union Commerce Bldg., Cleveland 14, has been made representative in Northern Ohio and Erie County, Pa., for Edward Valves Inc., East Chicago, Ind.

* * *

M & S Aluminum Foundry, recently constructed at 2403 South Macedonia St., Muncie, Ind., will produce job aluminum castings. Charles Mansfield is general manager.

* * *

Crawford Steel Foundry Co., 531 East Southern Ave., Bucyrus, O., suffered loss estimated at $25,000, Feb. 5, from a fire starting in the furnace room.

* * *

Link-Belt Co., Chicago, has moved its Pittsburgh district sales office to 5020 Centre Ave. Otto W. Werner is district sales manager.

* * *

Laclede-Christy Clay Products Co., 411 North Seventh St., St. Louis 1, has changed its name to Laclede-Christy Co.

* * *

Chas. A. Krause Milling Co., has moved its executive and general offices to 404 East State St., Milwaukee.

DISCOUNT SHEETS TOO COSTLY?

FERROCARBO Briquettes provide a means for realizing important reductions in scrap castings when used in cupola melting of *malleable iron* by the duplex process.

FERROCARBO Briquettes offer a prolonged increase in fluidity by helping maintain a higher metal temperature at the cupola spout. Annealing also is made more certain.

FERROCARBO Briquettes aid in reducing the number of shrinkage cracks and hot tears close to or at the point where risers feed castings. During "shake-out," there is less breakage of castings.

FERROCARBO Briquettes are a widely accepted agent for obtaining thorough degasification. Through their use, improved product performance at greater production economy is obtained. Get all the facts from our metallurgists.

FERROCARBO Briquettes
BY CARBORUNDUM
TRADE MARK

THE CARBORUNDUM COMPANY, Department B-48, Niagara Falls, New York

FERROCARBO Distributors: Kerchner, Marshall & Co., Pittsburgh, Cleveland and Birmingham; Miller and Company, Chicago, St. Louis and Cincinnati

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WEDRON

FINE SILICA SANDS

FOR EVERY FOUNDRY NEED

WEDRON	WEDRON	WEDRON
ROUND GRAIN SANDS ARE EASY ON CORE BOXES	FINE MESH SANDS ARE IDEAL FOR LIGHT METAL CASTING	SILICA FLOUR • WEDRON COARSE BLASTING SAND

WE OPERATE THROUGHOUT THE YEAR

WEDRON SILICA COMPANY

MINES AND MILLS IN THE OTTAWA-WEDRON DISTRICT

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NEW HEAVY-DUTY CART

WITH "3-POINT LANDING"

Here's just the cart you need for wheeling *coal, scrap, chips, turnings, borings* and similar heavy materials. All-steel, completely welded and reinforced. Made extra strong and rugged for heavy duty service. Dumps easily. Rests securely in any one of the three positions shown here. Available with roller bearings, if desired.

Write for Circular No. 50.

STERLING WHEELBARROW CO., Milwaukee 14, Wis.

Look for this Mark of STERLING Quality

Sterling WHEELBARROWS

A 4825-⅛

FOUNDRY SAND UNCONTROLLED

(*Continued from page* 95)

and supplies would be proportioned accordingly. In his next breath he insisted that our production must be doubled or tripled if Hitler and Hirohito were to be subdued. The damage done in the first breath made it doubly difficult to comply with the request of the second. However, the American foundry industry *did comply* and, despite all brakes and handicaps imposed, produced the necessary castings!

It was during this hectic period that our sand trouble reached its peak. We had blow and scab; and we had it in heart-breaking abundance. Everything had gone completely out of control, and was steadily getting worse. No one knew exactly what should be done, and the advice received ranged all the way from throwing the whole mess into the dumps—to burning down the shop. In desperation we turned to a straight synthetic mix which, probably due to our inexperience, only increased our difficulties. We next resorted to a semi-synthetic program—the use of two-thirds of old heap sand to one-third of new clean silica sand in our facing mix. This brought almost immediate relief, and our castings continued to show progressive improvement. We have adhered to this plan ever since, with considerable success. Today our heaps are over 99 per cent synthetic, and the old scab and blow trouble has for the most part disappeared.

Our Sand Committee—On Nov. 30, 1943, Northern California Chapter of the AFA organized its Committee on Foundry Sands and Mold Materials. The sand conditions previously described were not confined to a single shop, and this fact probably accounted for the eager response that greeted the chapter's youngest committee. Alex Homberger, whose achievements had eminently qualified him for leadership, was a moving spirit in this new organization. The value of the committee's work was immediately recognized, and early meetings were attended with unbounded enthusiasm. As major problems appeared to be solved and the questions up for discussion seemed more and more trivial, interest fell off, and so did attendance at the meetings. The committee was finally dissolved in 1947. Cause? Indifference!

However, sand troubles did not disappear with the committee's demise; nor did synthetic or semi-synthetic

(*Continued on page* 232)

FIVE REASONS WHY...

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COSTS LESS TO OPERATE AND MAINTAIN

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Dustube filters are light, compact, easy to ship and store. Wear is greatly reduced because, (1) tubes are never under tension, (2) no cloth-to-metal contact to corrode and abrade, (3) coarse, cutting dust particles never reach the fabric.

TWO

Installation of filters is a matter of mere seconds. Just hang the tube on the overhead hook—snap the retaining ring in the cell plate—that's all. No special tools are needed . . . one man does the job easily and quickly.

THREE

Nearly 100% by weight, of even very fine silica dusts, are trapped. Discharged air shows less than 10 million particles from 2 to 10 microns in size per cubic foot (as determined by the impinger method).

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April, 1948

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(*Continued from page* 230)

sand prove completely effective in preventing loss due to sand failure. As previously mentioned, scab and blow had practically reached the vanishing point when a new and equally deadly enemy appeared—old man "Buckle." This has become our number ONE problem, and we have attacked it from every conceivable angle—with little success. The cause and cure of buckle has been discussed at some length in our technical meetings and publications.

This defect is peculiar in many respects. Its cause has been described as "sand expansion," resulting from hard ramming, high moisture, improper drying, a lack of fines and cushioning materials, etc., etc. And yet when these conditions were reversed, the trouble still persisted in some degree.

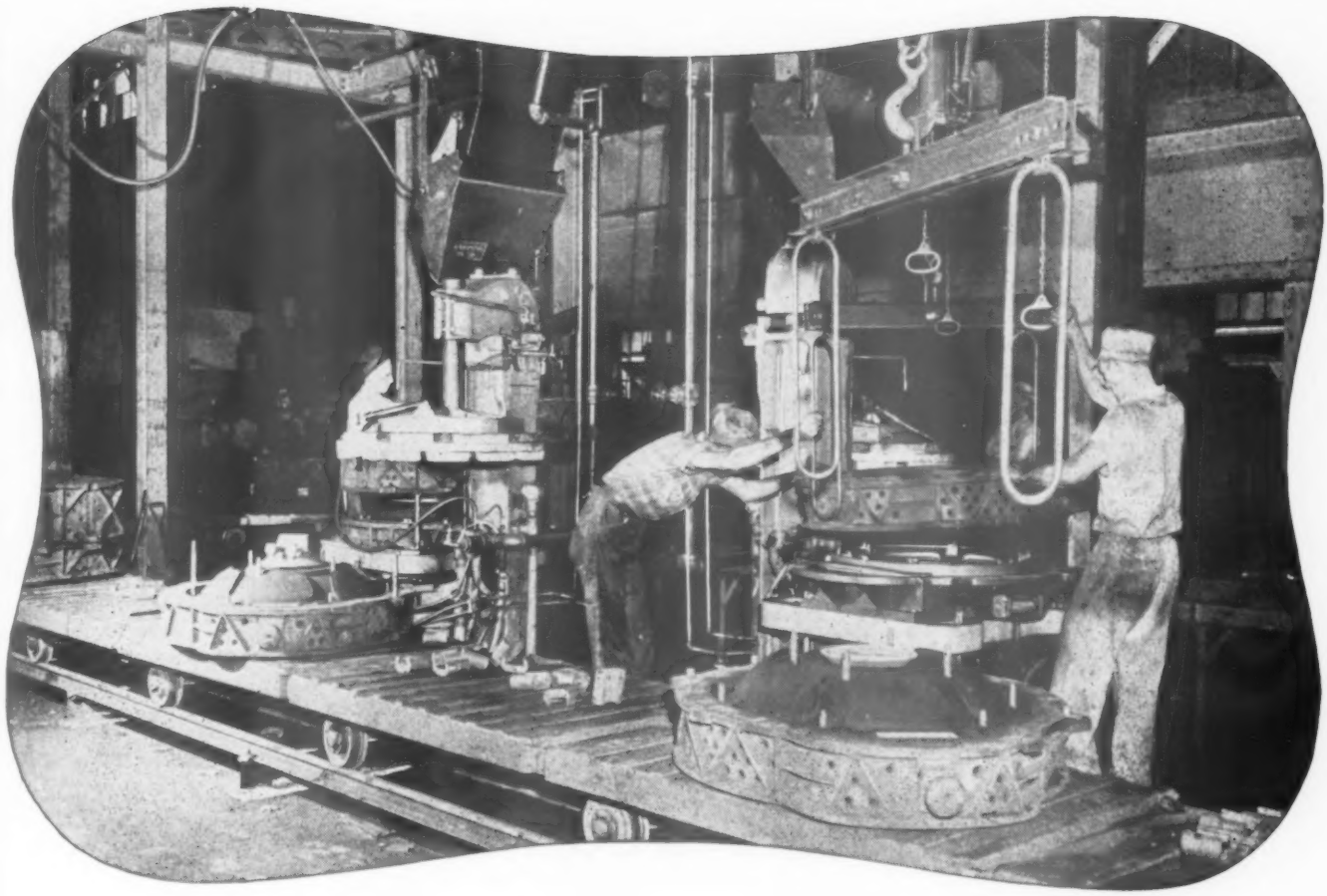
Soft Ramming No Help

Contrary to authoritive opinion, a mold that was rammed extremely soft (10 to 20 by the Dietert tester) produced one of the most beautiful buckles to be found in our collection. And to add insult to injury it was from a dry-sand mold. On one casting resembling a wheel there were flat spokes which were ribbed on the drag side, and this job was our greatest producer of buckles. It was always green-sand cope trouble, and unpredictable. This buckle would vary both in length and depth, and would hardly be found in the same place twice. By more than a hundred experiments we tried to isolate it. These included harder ramming, softer ramming, a variety of facing mixes—strong, weak, wet, dry, open, tight, coarse, fine—with and without pitch, seacoal, gilsonite, corn flour, wood flour, bentonite (both western and southern), fire clay, resin, oil, various backing sands, horse manure (hard to get now), and many other materials both wet and dry. But all to no avail! On a floor of ten molds we would have five buckles one day and two the next. The third day all ten castings would be good. Out of one hundred castings we probably lost 25 from buckle. Gates were changed; pouring temperature was raised, then lowered; and the buckle moved around to a more comfortable position—or became twins. This was all green-sand work, you understand.

Buckle cures and cancer cures have one thing in common—both are numerous and thus far completely ineffective.

Insulation — Many jobbing shops, ours included, have in recent years greatly increased their proportion of

(*Continued on page* 234)



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Those sleepless nights, worrying about too high production costs and lost orders can be avoided,— by installing Bartlett-Snow sand, mold and castings handling equipment. Individually engineered to your own particular requirements, Bartlett-Snow equipment enables foundry owners and plant managers to increase both the quality and quantity of their output. Costs go down. Your product finds readier sale. The workmen get larger take home pay—easier—like their jobs better, reducing absenteeism and turnover. And the smoother, more even, more continuous production means bigger profits, larger dividends for you. Can we send you more details?

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(Or where excessive heat, dust, lint, high humidity, etc., exist)
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(*Continued from page* 232)

dry-sand molds. While this method is generally recognized as being slower and more costly, it provides a definite safety factor, and requires only a minimum of molding skill—a fact that is all important under existing conditions. We may sneer at the molding methods of yesterday but those old boys could make saleable castings in green sand that most of us wouldn't dare attempt today. Hence we've turned to dry sand as a safer method.

Assuming that your facing mix is right, the item of second importance in a dry-sand mold is the insulator—mold wash, graphite blacking—call it what you will. The quality of this material and the method of its application largely determine the appearance of the casting. A suitable mold wash as an insulator not only provides a good peel, but in retarding heat transfer it also protects the sand and prolongs its usefulness.

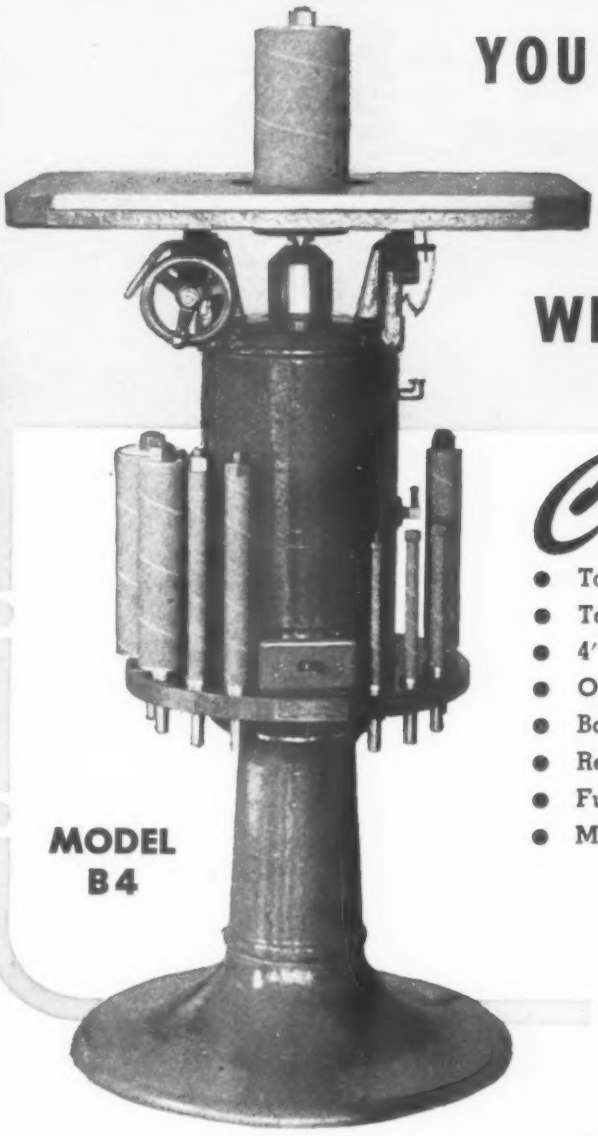
In the writer's opinion most if not all of the graphites and other mold washes sold nationally are of high quality and will, if mixed and used as directed by the producer, deliver full value to the user. However, the performance of a mold or core wash is undoubtedly affected by the sand which it covers, and by the ingredients which that sand contains. In our practice we were unable to find a proprietary wash that would effectively serve all purposes demanded. One that would work admirably on oil sand seemed to object to the pitch in our dry sand. And so we finally concocted a mix of our own. Using a graphite blend sold locally, we added 5 per cent fire clay and 10 per cent silica flour, all of which was thoroughly mixed mechanically. We found that a 12-hour standing period prior to use was required to completely expand the bond in this wash.

Inconsistent?—Lemonade has been termed an inconsistent mixture—we put in lemon to make it sour, then sugar to make it sweet. Foundry facing sand is equally inconsistent. We use fire clay and western bentonite to provide high dry and hot strength, and then we throw in southern bentonite, corn flour, wood flour, resin, etc., to kill some of that strength in order that the sand may collapse at the desired point in the cooling cycle. In one synthetic mix that was brought to my attention, the sand used was a grade of Ottawa with a permeability of 250. Twelve hundred pounds of this sand was mulled with 800 lb of silica flour, bringing the permeability down to 10 or 12. Sounds silly, doesn't it? How-

(*Concluded on page* 236)

YOU CAN CHANGE SPINDLES *Instantly*

WITH A STATE OSCILLATING SPINDLE SANDER



MODEL B4

Check THESE FEATURES

- Table tilts 45° by worm and gear device.
- Table quickly returned to exact horizontal position.
- 4" hand wheel for tilting.
- Oscillating mechanism runs in oil.
- Ball bearing motor enclosed in machine base.
- Rectangular table 20" x 24".
- Furnished with 9 spindles (as shown) ready for use.
- Machine weight 285 lbs.

MODEL D15

THERE'S *Utility Plus* IN A STATE 15" DISC SANDER

- Table 10" x 22" tilts 45° each way.
- Table quickly returned to exact horizontal position.
- Vertical adjustment of table—center to bottom of disc.
- Furnished with mitre gage, dust bag and extra disc.
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KRANE KAR cuts handling time! IT LIFTS, IT TRANSPORTS, IT SPOTS THE LOADS — loads of any shape or size up to 10 tons, using hook or magnet. Efficiently handles castings, patterns, flasks, cores, molds, ingots, scrap, sand boxes . . . and, with buckets, handles sand and clay. Rubber-tired, ***KRANE KAR*** operates indoors or outdoors. Loads and unloads trucks and freight cars. In repair operations, ***KRANE KAR*** moves foundry equipment to and from repair stations, spotting them for repair and installation. Our materials-handling expert will be glad to help you. Send for Bulletin No. 69.

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TAMASTONE will be a headliner at the 1948 convention in Philadelphia! See us at BOOTH 409 and 411.

TAMMS SILICA CO.

228 N. La Salle St., Chicago 1, Ill.

(*Concluded from page* 234)

ever, it produced a beautiful 35-ton casting. So it goes—we step on the brake and the gas at the same time and somehow we get what we want.

Universal Sand?—It is understood that at least one of our Navy shops proposes to use one grade of silica sand for all casting purposes—brass, aluminum, iron and steel, regardless of casting type or weight. This, they explain, will greatly simplify their office inventory. In our shop we are now using eight basic sands, and would like to have three or four more, if we had storage space. A grade of sand that is highly suitable for one type of work, is utterly worthless on another, and I am referring only to iron practice.

Our molding sand and facing are of two types—green sand and dry sand. Both are synthetic. Our dry-sand facing is composed of two-thirds coarse heap sand and one-third new silica sand, AFA No. 40, bonded with western bentonite and fire clay to a 10-lb green compression strength, and with an addition of pitch compound at a 1 to 40 volume ratio. This sand is worked at 6.5 per cent moisture. Our green or fine-sand facing consists of two-thirds fine heap sand and one-third new silica, AFA No. 68, and is bonded to a 10 or 12-lb green strength, with fire-clay and southern bentonite. Seacoal is added at a ratio of 1 to 15 by volume. On a medium grade of work this sand performs best at about 5 per cent moisture. (Note: In our experience, here in the West, AFA fineness numbers don't tell us very much. Sand language should be made more explicit.)

The two sands just mentioned are of subangular grain, and have very definite limitations. The fine sand produces a saleable finish on most castings poured green, from an ounce in weight up to about a hundred pounds. Beyond that we are likely to get into trouble. The coarse sand is used solely for oven-dry and portable-dryer work, on jobs from 100 lb to 10 ton.

We confine ourselves to these two grades of molding sand because it simplifies matters for the man at the muller, and also because our shop facilities do not permit of proper segregation. However, if floor space and mixing facilties were adequate, I would like to have eight or ten types of molding sand in daily use, in order to be able to fill the most exacting requirements. (This, of course, is just a sand man's dream.) I can't even keep two grades properly segregated! What would I do with ten?

"IRONTON NOJOINT" for Foundry Ladles

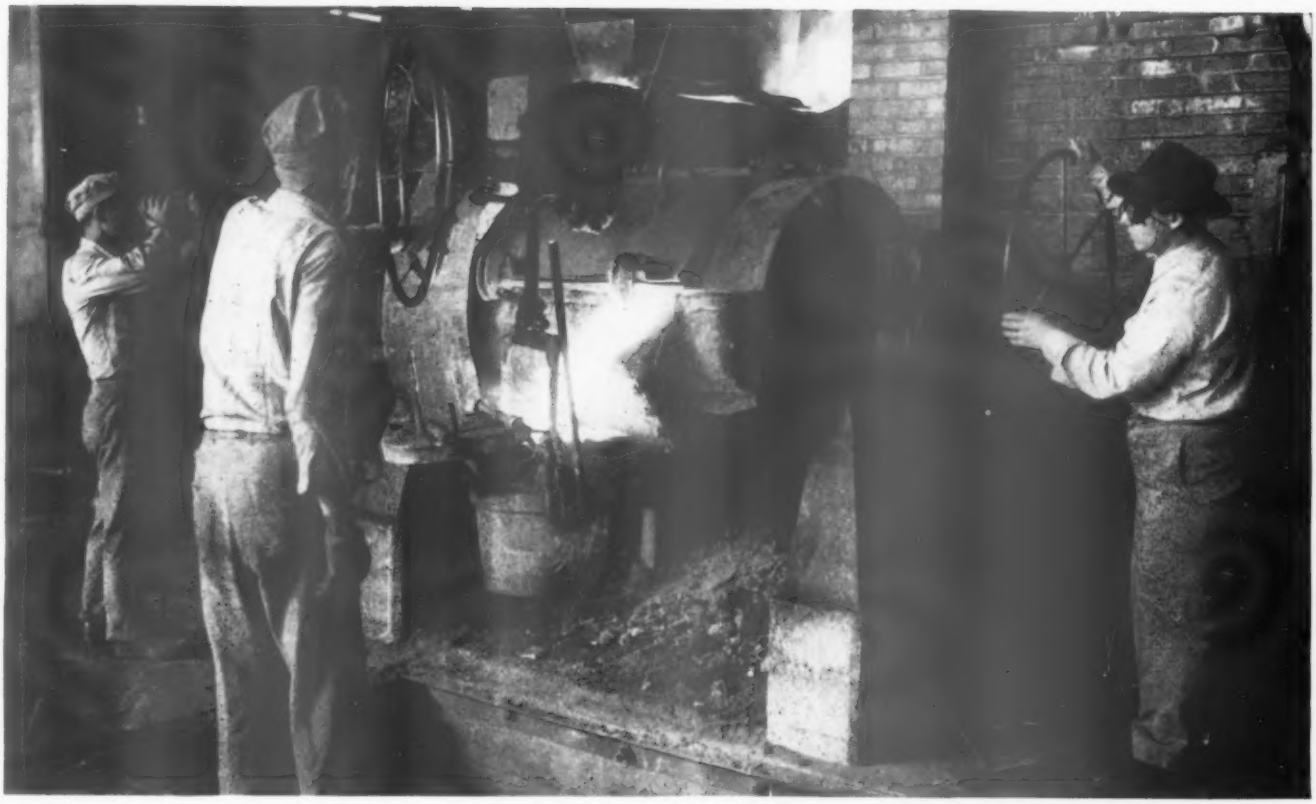

Photo Courtesy—McNally Pittsburg Foundries, Inc.

"Ironton Nojoint" gives much longer service than regular fire brick or special shapes when used as a rammed lining in cylindrical mixing, receiving or desulphurizing ladles, especially when "Purite" is used. The solid, dense, monolithic lining is free of joints and cracks and is very resistant to molten iron and alkaline slags.

"Ironton Nojoint" is packed in 550 lb. steel drums to prevent drying out in storage, and it will remain moist and workable indefinitely. It is economical to use, and may be quickly and easily installed.

We offer you the assistance of an experienced engineer in installing your original lining and training your men to do the job.

THE IRONTON FIRE BRICK COMPANY

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IRONTON OHIO

New Equipment *and* Supplies

(1)—Moisture Trap: Jas. A. Murphy & Co., Fifth and Vine Sts., Hamilton, O.—Moisture trap uses a "heel" and an automatic trap of the proper size and capacity to catch moisture condensation in spots where an air line bends from horizontal to vertical. Trap need not be installed as shown, but may be mounted at any convenient spot near post or wall and a pipe lead from trap to heel. Ball float and inverted bucket traps are recommended for pipe lines up to 2 1/2-in. dia. On pipe lines of larger size the company's zip action trap is suggested.

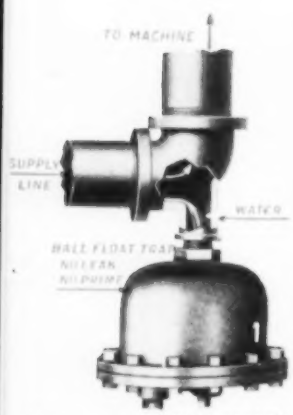
(2)—Bandsaw: DoAll Co., 254 North Laurel Ave., Des Plaines, Ill.—Spiral saw band provides a 360 degree cutting edge so that material can be cut in any direction without rotating the work. The saw and rubber roller saw guides may be adapted to any sawing machine. The special saw guides are said to keep the blade in perfect alignment. It is claimed that the saw can be used also for filing small radii in openings inaccessible with ordinary bench file or needle file equipment. Saw is available in two types: Spring tempered for wood, plastics, etc., and hard edge for cutting all metals. Each type comes in two sizes: 0.040 and 0.074 diam with a 15-tooth pitch. Cut lengths or 100-ft coils are available, and the blades may be welded on conventional butt welders.

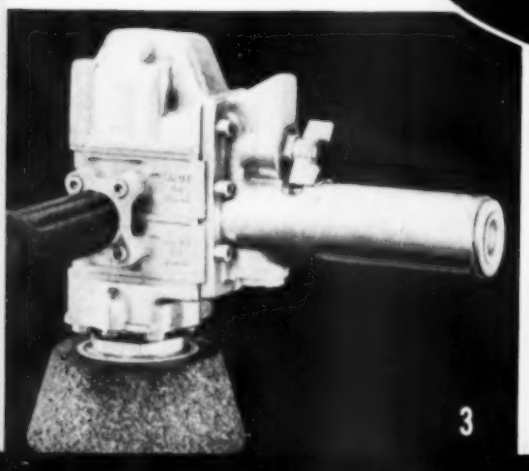
(3)—Grinder: Rotor Tool Co., 17325 Euclid Ave., Cleveland—Vertical grinder is suitable for grinding large and small castings, leveling off welds, removing gates, fins, etc. It operates at 8000 rpm for 4-in. elastic wheels, and 5000 and 6000 rpm for 5-in. wheels. Used as a sander, it operates at 8000 rpm with 5-in. pads and 6000 rpm with 7-in. pads. Through the use of magnesium in end plates, top and bottom caps and handles, weight of the machine has been held to 8 1/2 lb. Governor which idles the machine and permits the free speed as determined by the safety code is said to open quickly to deliver full air at high load speed.

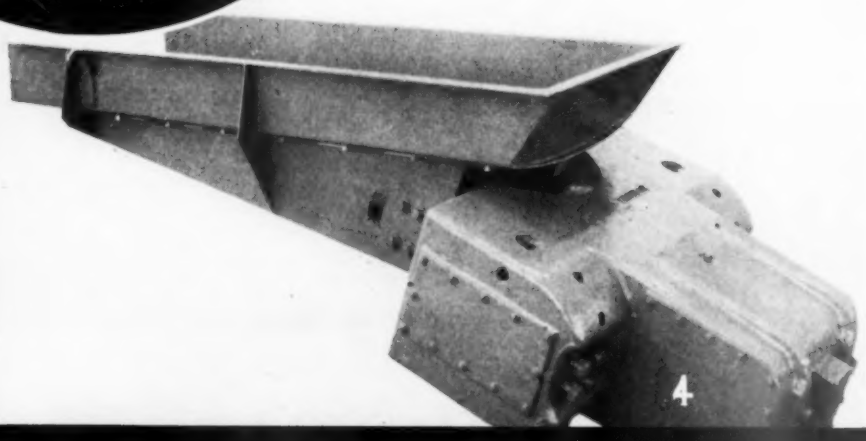
(4)—Vibrating Feeder: Jeffrey Mfg. Co., Jeffrey-Traylor Division, 907 North Fourth St., Columbus 16, O.—Electric vibrating feeder with enclosed dust-tight power unit is designed for use in installations where the material to be handled is magnetic, hot, dusty and abrasive. The design is said to eliminate troubles caused by hot magnetic dust sifting down on the open magnetic motor of the vibrating feeder or conveyor and causing damage to coils and pole faces. Unit is equipped with inlet and outlet for circulating cooling air through the motor. It also has an adjustable support which permits changing the slope of the feeder from 5 degrees up grade to 15 degrees down grade.

Dew Point Recorders: Foxboro Co., Foxboro, Mass.—Continuous dew point recorders and recording controllers are available with various standard chart ranges, two of the most common being −20°F to + 92°F dew point and 36°F to 160°F

(*Continued on page* 240)



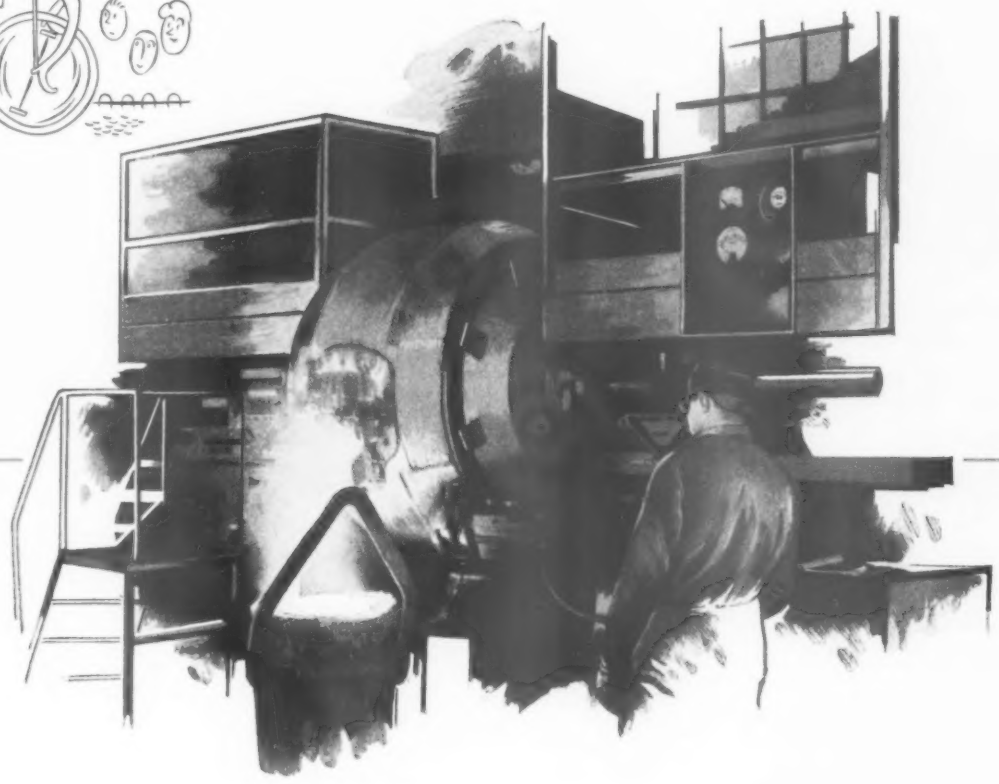




VERSATILE •

DETROIT ELECTRIC FURNACES

MELT DOZENS OF DIFFERENT ALLOYS FAST!



Versatile—that's the word for Detroit Rocking Electric Furnaces, *a wise investment* in flexible foundry operation. They swiftly melt both ferrous and non-ferrous metals in a wide variety of alloys. They melt from 6 lb. to 2 ton heats, depending on model. Many are designed for quick change of shells. It is possible to melt different alloys in a single day. All are equipped with simplified controls that *make production of a broad range of metal analyses easy* because they closely regulate power input, composition, and melting time.

Compact Detroit Electric Furnaces occupy minimum floor space. *They operate cleanly and easily.* And they are economical in power consumption. A Detroit Electric Furnace representative will be glad to discuss your production problems with you and show you how *these modern, versatile furnaces will lower your over-all production costs.*

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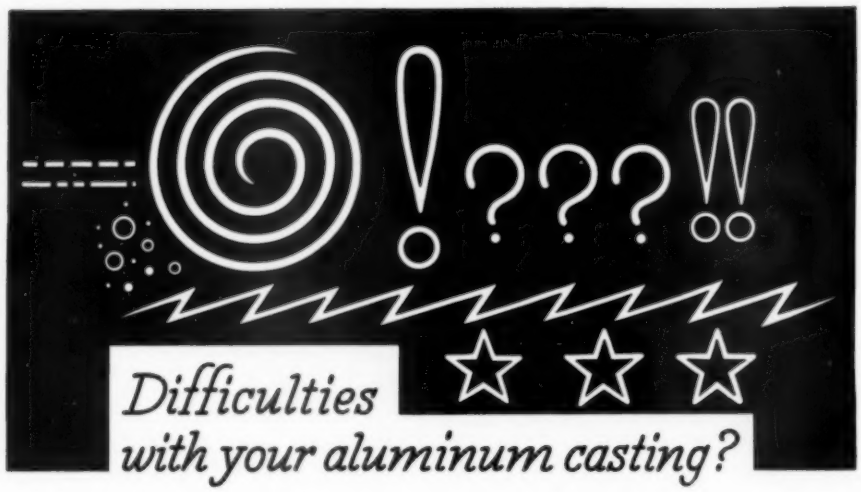

In many instances, improperly specified aluminum alloys are the root of casting problems. Special or modified aluminum alloys, such as those we have been producing over a period of 30 years, often solve foundry casting problems and lower production costs. If you should run into aluminum casting difficulties, please feel free to consult with us. It is our business to be specially informed on aluminum and aluminum alloys.

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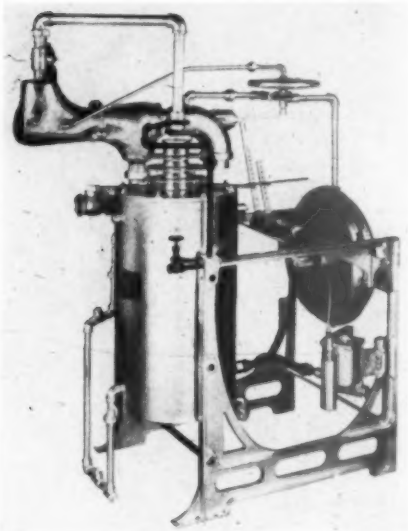
Load-Handling Specialists since 1904

(*Continued from page* 238)

dew point. An all-electronic instrument and a liquid-filled system type instrument are offered. They can be installed almost anywhere, indoors or outdoors and the recording instrument can be as much as 600 ft from the measuring element. For normal operation the instruments consume 1 to 8 w.

Gas Generator: Vapofier Corp., 10316 South Throop St., Chicago 43—Compact unit is designed to produce gas from fuel oil for all types of industrial ovens and furnaces. Used as a standby unit, the

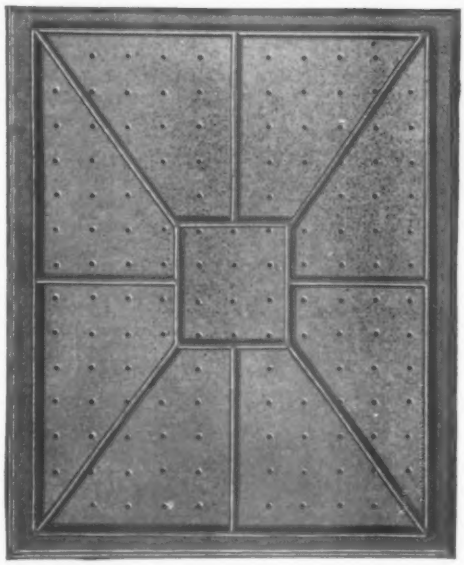


generator is said to permit switchover to gas without interruption of flame or change of flame quality. It automatically maintains constant manifold pressure and air-gas ratios from a reducing to an oxidizing flame. Gas produced has low hydrogen content and the flame is clean, sootless and odorless.

Heat for Feeding: Pittsburgh Metals Purifying Corp., 1352 Marvista St., Pittsburgh 12—Chemical compound develops heat energy intended to preserve the feeding metal of aluminum castings in the liquid state from a few minutes to several hours—the time being controllable by varying the amount of material used. The compound is excited at about 300° F, and an exothermic reaction develops a slow but intense evolution of heat energy up to 3150° F. The material can be molded into any desired shape before using, and will retain its original shape during and after the exothermic reaction. When burned out, it remains as a refractory insulating body which is claimed to retain the heat it has generated long

(*Continued on page* 242)

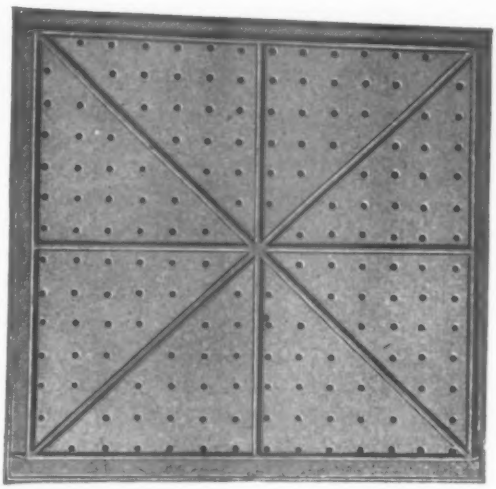
DIAMOND CUSTOM-BUILT
CORE PLATES



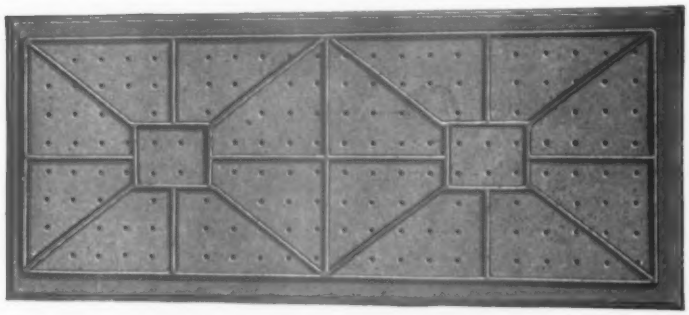
STYLE CP-3 —This type reinforcing on "square" plates for loads up to 1200 lbs. Typical sizes run 40" x 50" and 36" x 60".

CARRY CORES UP TO 1200 LBS. WITHOUT DEFLECTION!

Less baking time with Diamond Plates . . . because sturdy construction with light weight is achieved. They heat up and cool more quickly. Fabricated from ½" or heavier plate as indicated to meet load requirements, users acclaim the long-life and uniform quality of Diamond Plates. Available in special and standard sizes to suit your exact requirements.



STYLE CP-1 —This construction used on plates in the 30" x 30" range for core loads up to 200 lbs.



STYLE CP-2 —For long and narrow cores and loads to the 1200 lb. range. Note web-bracing construction.

HOW TO ORDER DIAMOND CORE PLATES

Since we recommend "job fitted" plates for real production efficiency, we suggest your telling us *how heavy your core loads will be* and the *approximate overall plate* size. We will design reinforcing accordingly, and quote in terms of plates best suited to your needs.

DIAMOND

Telephone 2553 CLAMP AND FLASK COMPANY Richmond, Indiana

Designers of CORE PLATES, JACKETS, BANDS, FLASKS *since 1889*

(*Continued from page* 240)
after the metal solidifies in the mold. When used in the form of feeding core inserts under feeding heads or in molds, it is said to permit regulation of directional solidification, and to produce dense castings with uniform grain structure and high tensile strength.

Electrode: Hobart Bros. Co., Hobart Square, Troy, O.—Copper-nickel alloy electrode having a mineral flux coating for metallic arc welding is said to produce nonferrous welds, light gray in color, malleable, easily machineable and with tensile strength equal to good cast iron. Electrodes are available in 3/32, ⅛, 5/32 and 3/16 in. diam. in 18-in. lengths, center brushed. They may be used on ac or dc.

Voltage Tester: Ideal Industries Inc., 1922 Park Ave., Sycamore, Ill.—Instrument tests continuity of circuits 110 to 550 v ac, 110 to 600 v dc, blown fuses, grounded side of line, grounded side of motor or appliance, excessive leakage to ground, frequency (25 or 60 cycle) and direct current polarity. Indications are by a solenoid indicator and a neon test lamp operating independently. Instrument is contained in a tubular plastic case 6 in. long. Scale is calibrated from 110 to 600 v; leads are 2 ft long; test prod handles are 4 in. long; test prods are 2 in. long. Unit comes in carrying case with belt clip. Weight is 8 oz.

Skid: Wellman Bronze & Aluminum Co., 6018 Superior Ave., Cleveland—Magnesium barrel skid is 9 ft long, weighs 33 lb and has a load

capacity of 800 lb. Cast hooks and shoes are replaceable. Skid is said to provide safe, rapid handling of all types of barrels.

Core Binder: Chemical Department, General Electric Co., Pittsfield, Mass.—Phenolic resin sand core binder is said to be uniform, flexible and nonsticky, with good flowability and low moisture content. Other characteristics claimed for the material are that it imparts enough dry strength to the core materials to allow the core to be handled while still warm; that with a minimum of baking time and temperature it imparts sufficient strength to the core to withstand pouring temperatures of 2750° F; that it has low hot strength and excellent green strength and evolves little gas during pouring and that it will not impair the properties of the core material after shakeout.

Puller: Coffing Hoist Co., 800 Walters St., Danville, Ill.—Puller is designed to lift or pull a 500-lb load with only 28 lb of effort. It has a rated capacity of 500 lb but its chain has a tensile yield of 2000 lb and its snap hooks a tensile yield of 3000 lb. Weighing only 6½ lb with chain, the puller features a two-way handle that can be used as a high speed crank or a ratchet lever. It is a compact unit that will fit into a small tool box.

Magnet Crane: Wayne Crane Division, American Steel Dredge Co. Inc., P. O. Box 570, Fort Wayne 1, Ind.—One-man, single-engine, self-propelled magnet crane has hydraulic

steering, an 8-ft wheel base and a 22-ft turning radius. It accommodates 29-in. or 36-in. electromagnets powered by 3-kw or 5-kw generators. Crane travels on four dual sets of standard pneumatic tires and is said to move, lift, boom and swing simultaneously or independently.

Die Casting: DCMT Sales Corp., Beach 79 Street at Bay, Rockaway Beach, N. Y.—Die casting machine is designed for casting zinc and aluminum at a production rate of about 350 shots per hour for each metal. Capacity is 2 lb zinc and 1 lb

(*Continued on page* 244)

...for top air output *plus* economy

Davey Model 315

SPECIFY DAVEY DEPARTMENTAL *Compressors*

IN LINE with today's trend toward employment of small departmental compressors instead of one large centralized machine, Davey offers a complete line of industrial units.

These are available in 60, 105, 160, 210 and 315 c.f.m. capacities. And every Davey has GUARANTEED LIFETIME VALVES.

DAVEY DEPARTMENTAL COMPRESSORS GIVE YOU THESE ADVANTAGES

- Power savings
- Lower air losses
- Maximum air operating efficiency
- Make plant expansions easy and economical
- Eliminate shutdowns due to compressor failures
- Air cooling eliminates water bills
- Ease of installation
- Reduced maintenance and replacement expense

DAVEY COMPRESSOR CO. • KENT, OHIO

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DAVEY

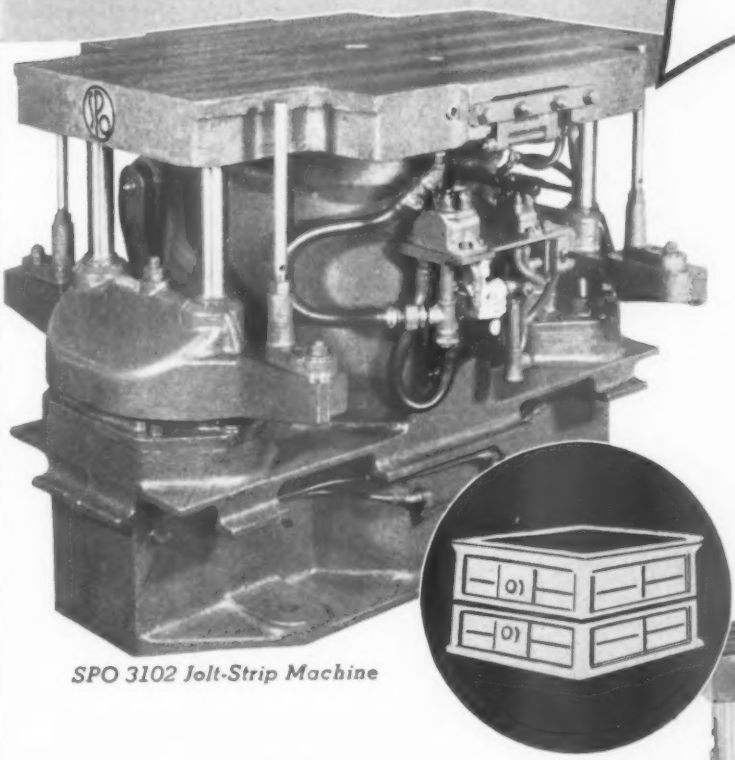
P&P-102

DAVEY COMPRESSOR CO. *Dealers in Principal Cities*

FOR ENDURANCE AND LONG LIFE CONSIDER SPO MOLDING MACHINES

FOR MAKING *Copes* OR MAKING *Drags*...

YOU CAN'T BEAT THE SPO *No. 300 Series!*



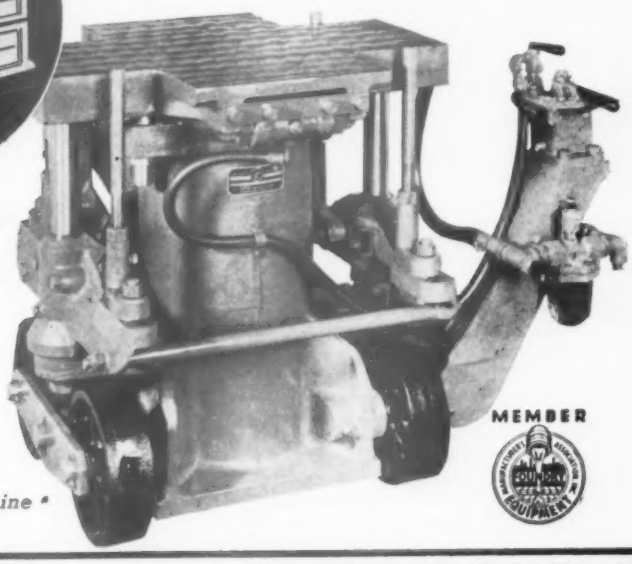
SPO 3102 Jolt-Strip Machine

• You simply can*not* beat the steady, reliable performance of these long-lived SPO No. 300 Series Jolt-Strip Molding Machines. . . . This is true, whether you use them to make copes or drags or both. It is true, likewise, throughout a wide range up to 2500 pounds.

* * *

Ask for full information.

See us at BOOTH 1027 at the PHILADELPHIA CONVENTION



SPO 3058 Jolt-Strip Machine

MEMBER

SPO INCORPORATED

Manufacturers and Specialists in Molding Machines, Vibrators and Patterns for Production

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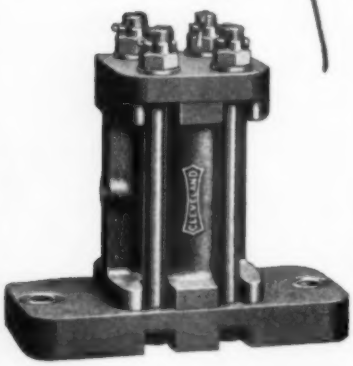
CLEVELAND Pneumatic VIBRATORS

Keep the sand moving



CLEVELAND

Designed to eliminate 'arching-over' and 'plugging' . . . . insures a steady continuous flow of sand from hoppers, bins and chutes . . . . economical installation and operating cost . . . . available from stock in a wide variety of sizes for use on any sized bin whether it contains one ton or several hundred tons of sand . . . . engineered to deliver rapid, powerful, hammer-like blows of greater intensity than can be expected from any other type of vibrator . . . . Recommendation as to type and size required is promptly made on receipt of information as to size and capacity of your hoppers, bins or chutes.

CLEVELAND VIBRATOR COMPANY

2828 Clinton Ave., W. Cleveland 13, Ohio

(*Continued from page* 242)

aluminum on 12 x 18-in. standard die blocks. There are no tie bars through the die blocks, which leaves all four sides open for core pulls or placement of inserts. Die carrier slides on dovetail ways. Machine is completely pneumatically operated and is controlled from one toggle switch. Length is 7 ft, 6 in.; width 2 ft, 6 in., and height, 5 ft. Weight is 2600 lb.

Safety Shoe: Lehigh Safety Shoe Co., Race and Court Sts., Allentown, Pa.—Combination safety shoe for work and dress has heavy Chro-

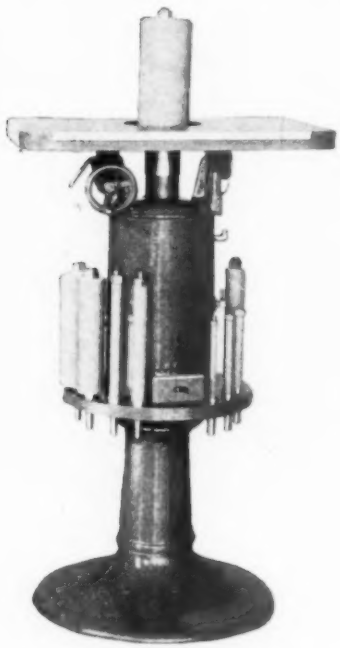
tan outersole, oak middlesole, half rubber heel with leather base, steel shank, Goodyear welt, and a steel toe box. Because of its combination dress-work utility, the shoe is said to overcome objections to buying an "extra" pair of shoes for safety on the job.

Tumbling Barrel: D. J. Murray Mfg. Co., 1002 Third St., Wausau, Wis.—Tumbling barrel is designed to deburr, burnish, clean, polish and smooth-surface metal and plastic

parts on a mass production basis. Dump pans are mounted on casters and are provided with bail handle notched for crane hook. Separating screens of various mesh wire can be mounted in frames to fit dump pans. All moving parts such as the barrel, gears, pulleys and motor are protected with guard rail, steel enclosures and concealed design for safety.

Welding Torch: Air Reduction Sales Co., 60 East 42nd St., New York 17—Oxyacetylene welding torch weighs 1 1/2 lb and is 11 1/2 in. long. It has a capacity for operating single flame welding tips from Nos. 0-13 inclusive as well as multi-flame tips up to No. 15, making it suitable for almost any welding job from thin sheet metal up to metal 1½ in. thick. Cutting attachments are available.

Spindle Sander: Freeman Supply Co., 1152 East Broadway, Toledo 5, O.—Direct motor-driven, oscillating spindle sander has a 20 x 24-in. table, ball bearing spindle, ball bearing motor and oscillating mechanism enclosed in oil bath. Nine



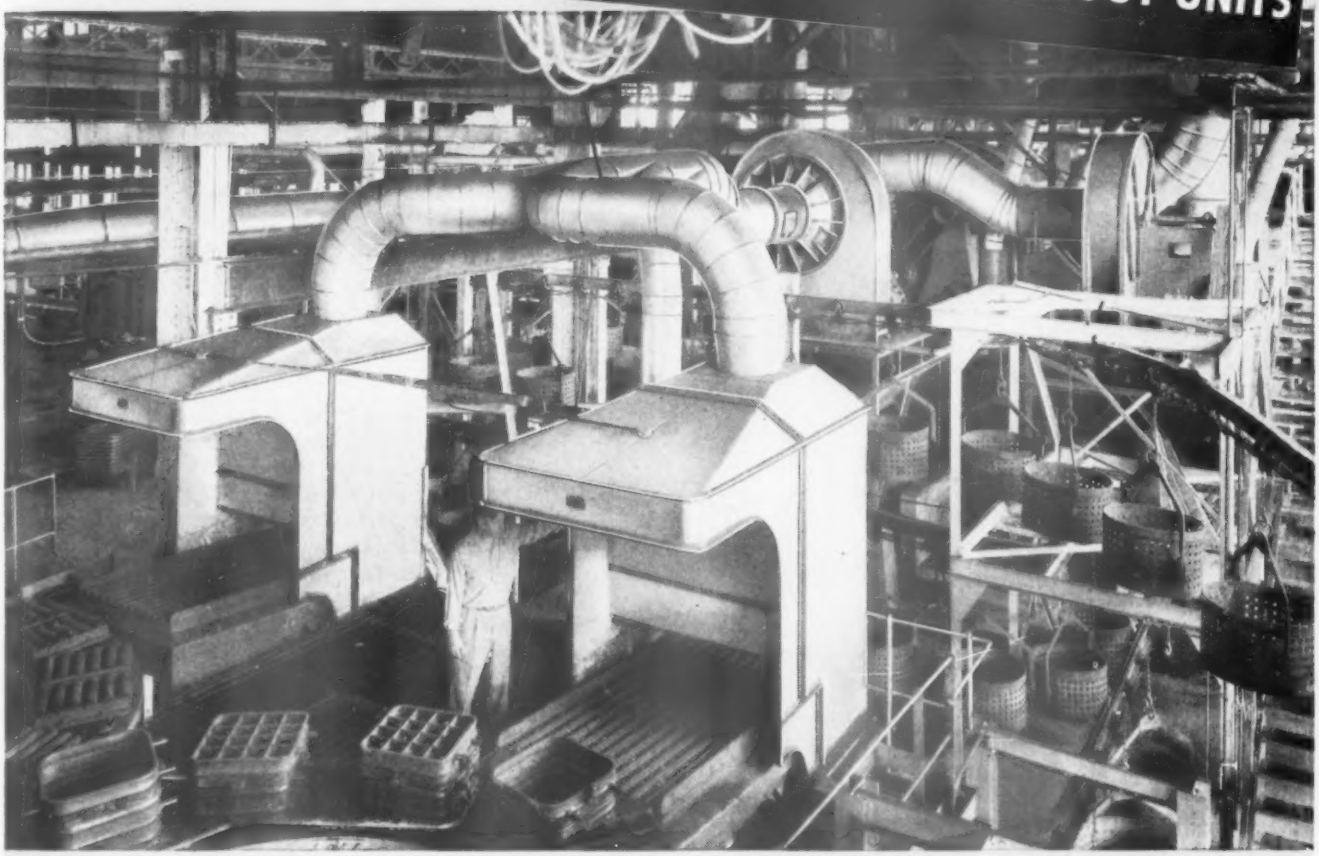
spindles in a range of sizes are furnished, and they are all instantly interchangeable without using tools. This machine is said to have numerous uses in plants working wood or metal patterns.

Hoists: Ford Chain Block Division, American Chain & Cable Co. Inc., York, Pa.—New line of electric hoists has capacities ranging from 250 to 2000 lb. They can be furnished with hook or bolt suspension, and with trolleys, either parallel or cross mounted. Equipped with preformed wire rope and grooved drum, the hoist will lift a distance of 12 ft; 20-ft lift can be furnished

(*Continued on page* 246)

modern foundry practice...

...DUST CONTROL FOR PRODUCTION LINE SHAKEOUT UNITS



...engineered & installed by KIRK AND BLUM

Typifying modern foundry practice are the methods and equipment used in the large midwestern foundry illustrated above. And prominent among this modern equipment are five separate KIRK & BLUM Dust Control Systems. The unit illustrated is installed on the production line shakeouts. Note how the equipment has been designed for non-interference with foundry production.

Castings move along inclined shakeout grate, opening hinged gate automatically by contact, and castings drop into conveyor baskets.

Other examples of KIRK & BLUM air-engineering are illustrated and described in the latest edition of booklet M, "Dust Collecting Systems in Metal Industries." Write for your copy today.

FOR CLEAN AIR... THE INVISIBLE TOOL

THE KIRK and BLUM MFG. CO.
2808 SPRING GROVE AVENUE
CINCINNATI 25, OHIO

KIRK AND BLUM
DUST CONTROL SYSTEMS

THIS LITTLE BOOK MAY SAVE YOU BIG PRODUCTION MONEY!

- Tells how you can save from 10¢ to 20¢ a pound on high speed steels and get better results!
- Gives actual shop tests and comparisons!
- Practical data on heat treatment!
- Tells you how manufacturers are cutting production costs!

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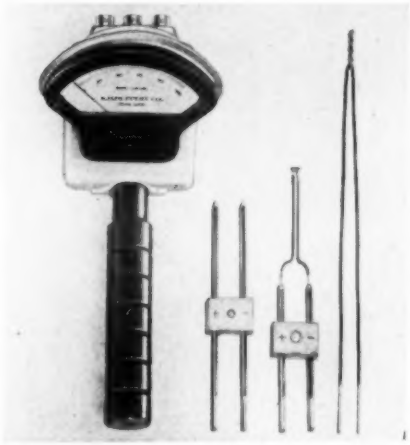
(*Continued from page* 244)

when specified. Pull chain and handle supports push button control station and is used to pull loaded or unloaded hoists along runway beams.

Thermocouple: K. H. Huppert Co., 6830 Cottage Grove Ave., Chicago 37—Closed end pyrometer thermocouple has a silver tip suitable for highly accurate temperature readings on hot metal, rubber or plastic surfaces. Instrument weighs 1¾ lb and has a cast aluminum body with the scale set at an easily read angle designed to prevent distortion and side reflections. Six-in. handle that screws solidly into front of the instrument body provides a firm, comfortable grip. Standard duo-range scales in either Fahrenheit or Centigrade are carried, with special scales made to order. Instrument is said to

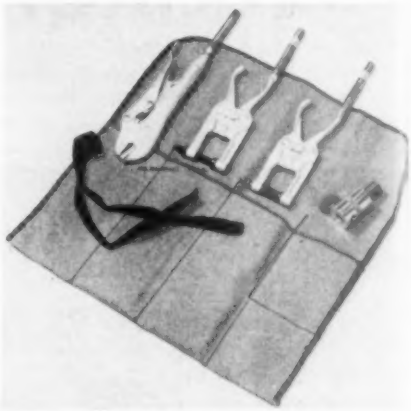


provide accurate temperature readings within 2 per cent of absolute accuracy.

Welding Rod: Eutectic Welding Alloys Corp., 40 Worth St., New York 13—Color-matching flux-coated torch welding rod is designed for all types of gray or alloy cast iron and to eliminate the uncertainties and delays of manual fluxing when welding stressed cast shapes. Rod is said to develop a tensile strength of 48,000 psi in the weld deposits, bonding at 950 to 1400° F, with a remelt temperature of 2200° F. Its coefficient of expansion is rated the same as that of gray cast iron, with hardness of approximately 190 brinell providing machinable welds.

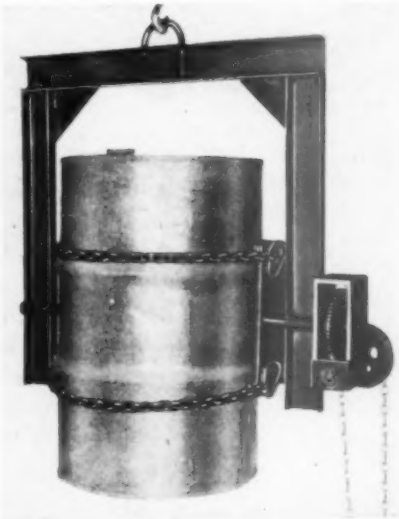
Thermocouple Tube: Claud S. Gordon Co., 3000 South Wallace St., Chicago—Cast iron thermocouple protecting tube for use in molten aluminum, zinc and die-casting metals is cast with both ends open, and one end is welded closed by a special technique. Tube is said to be non-porous with uniform wall thickness and free from casting and welding defects. Wall thickness is 3/8 in. and inside diameter is 15/16 in.

Holding Devices: Lapeer Mfg. Co., 2906 West Grand Bldg., Detroit—Kit of holding devices is designed for handicapped persons. De-



vises are said to permit an amputee to grip almost any tool and perform tasks with practical efficiency. Locking and releasing of a tool can be done with a flick of a lever. Gripping pressure is adjustable. Kit contains three devices—vise wrench, 7 in. long, which will hold any shape; pliers with screwdriver slot on spindle to facilitate pressure adjustment to accommodate varying thicknesses held, and a flexible grip pliers which automatically adjusts to varying thicknesses of materials held, up to ⅜-in. Kit is supplied with a tool holding adaptor that can be screwed to any standard artificial arm.

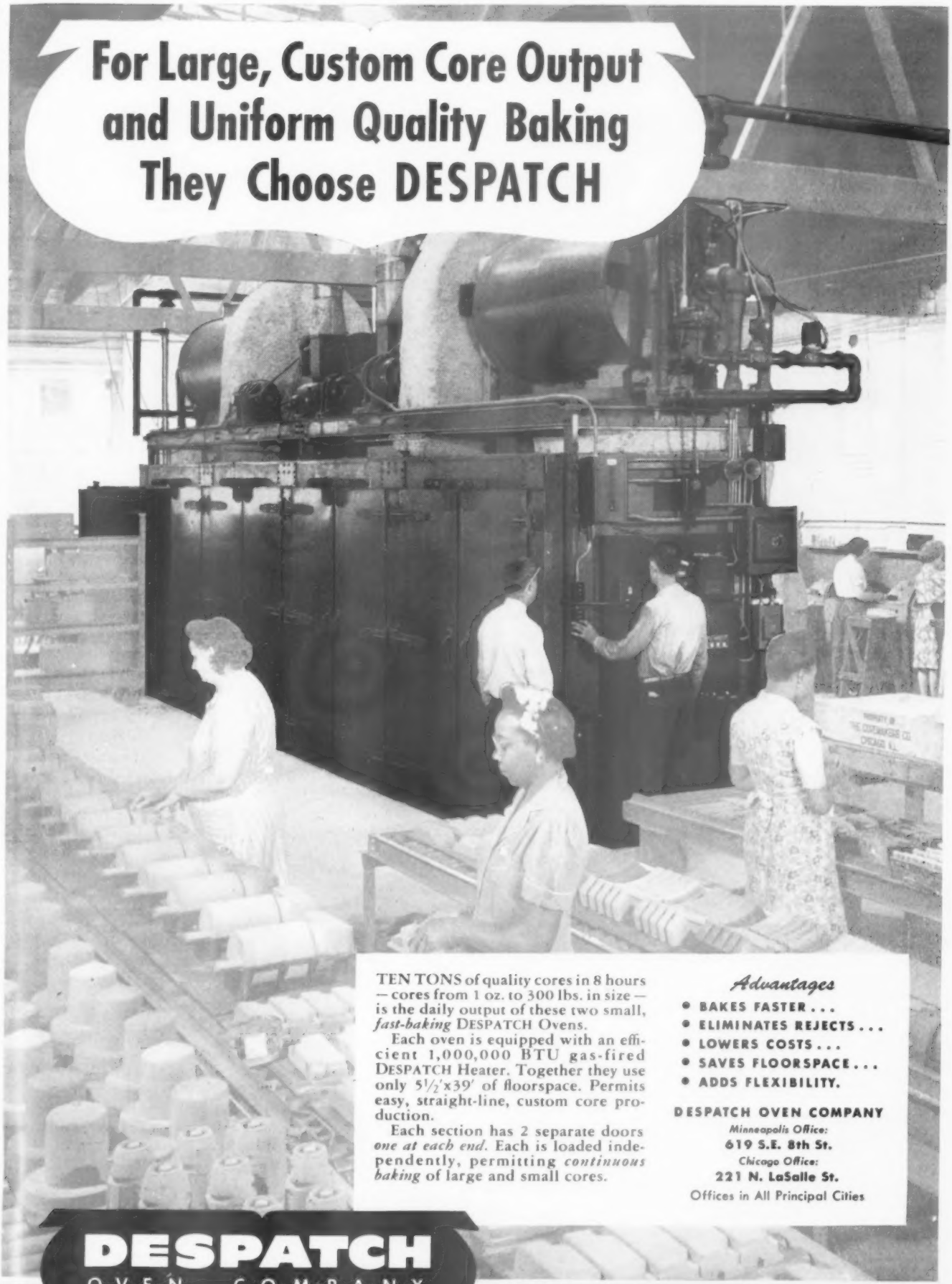
Barrel Tilt: Palmer-Shile Co., 16033 Fullerton Ave., Detroit 27—Designed to eliminate hand dumping,



this drum and barrel tilt is said to provide controlled dumping of chemi-

(*Continued on page* 248)

For Large, Custom Core Output and Uniform Quality Baking They Choose DESPATCH



TEN TONS of quality cores in 8 hours — cores from 1 oz. to 300 lbs. in size — is the daily output of these two small, *fast-baking* DESPATCH Ovens.

Each oven is equipped with an efficient 1,000,000 BTU gas-fired DESPATCH Heater. Together they use only 5½'x39' of floorspace. Permits easy, straight-line, custom core production.

Each section has 2 separate doors *one at each end.* Each is loaded independently, permitting *continuous baking* of large and small cores.

Advantages

- BAKES FASTER . . .
- ELIMINATES REJECTS . . .
- LOWERS COSTS . . .
- SAVES FLOORSPACE . . .
- ADDS FLEXIBILITY.

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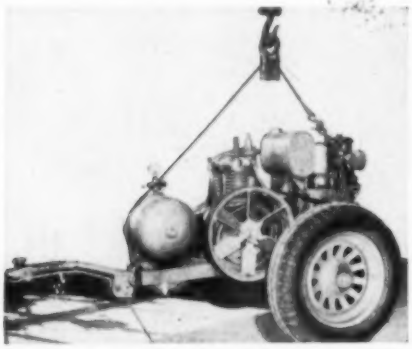
DESPATCH
OVEN COMPANY

WRITE TODAY for Bulletin J-31

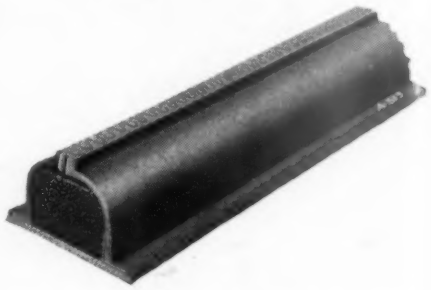
(*Continued from page* 246)
cals, liquids, plastic, molding powder, scrap, etc. Unit is equipped with two safety style locking devices that hold barrel securely without slippage. Mechanism incorporates the worm drive principle and is offered in hand chain models which turn the barrel 360 degrees. Model illustrated has 1000 lb capacity for standard 55-gal. drum or barrel. Special sizes or capacities can be built to meet requirements.

Lifting Slings: Caldwell Co., Dept. 30, 1830 Camp Ave., Rockford, Ill.—Equalizing slings are designed to lift odd shaped and unbalanced



loads level or at almost any predetermined angle and are available in capacities ranging from ¾-ton to 12 tons with a safety factor of 5. Sling consists of an equalizing unit equipped with wire rope. Equalizing unit is made up of a sheave (with V-shaped groove) carried by a spring-mounted axle, and a pair of brake shoes. The rope, which lays over the sheave in the V-shaped groove has a hook attached to each end, forming two legs. Rope hooks are attached to the load and hoisting power applied. Sheave revolves to allow rope legs to adjust themselves to weight distribution, and as tension is increased the sheave is pulled into the brake shoes, frictionally locking legs until pressure is released.

Conveyor-Elevator: Stephens-Adamson Mfg. Co., P. O. Box 272, Aurora, Ill.—"Zipper" enclosed belt, continuous conveyor-elevator is designed for carrying granular, flaky, pulverized or small lump materials. Material is conveyed and elevated in any direction, in a solid mass, entirely enclosed within the belt. At discharge point, the belt is automatically opened for complete discharge of material. Belt side walls and teeth are molded, vulcanized rubber with no metal embedded or exposed. Base of belt is high grade transmission type and can be made as strong in tensile strength as the application requires. Changing travel direction of a closed belt requires a 6-ft radius—open belt will move around bends on 20-in. diam pulleys. Base of closed belt



is 4-in. wide. It is designed to carry 0.07 cu ft of material per foot of belt at speeds of 1 to 200 fpm.

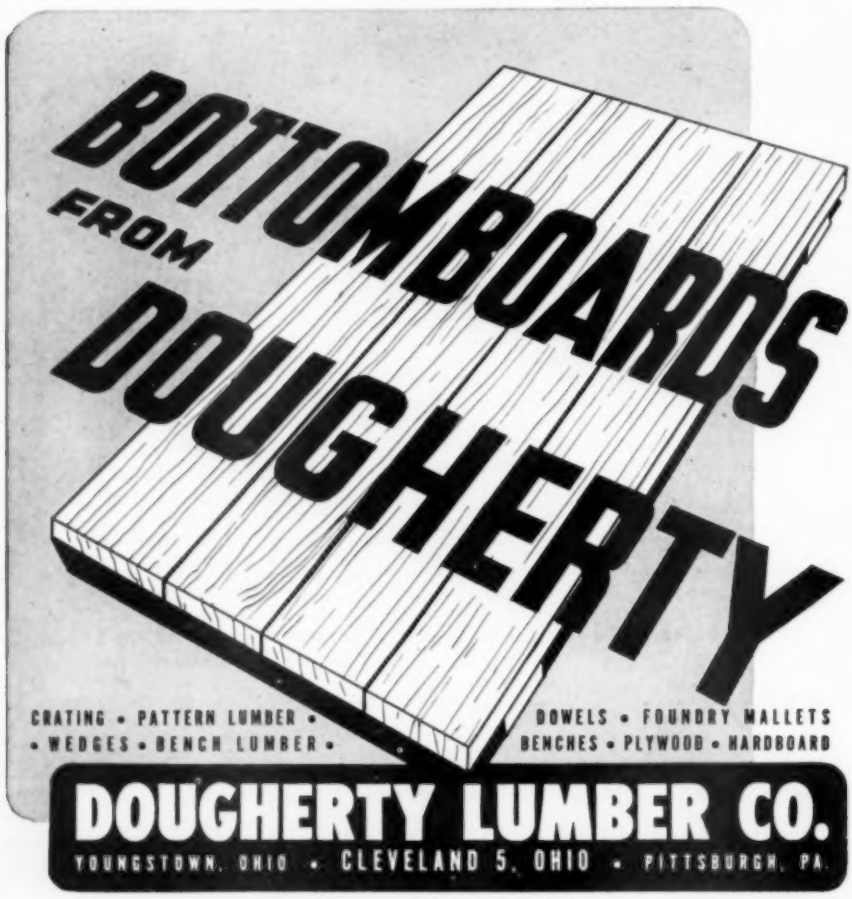
Air Vise: Van Products Co., 1501 G. Daniel Baldwin Bldg., Erie, Pa. — Heavy duty air vise is heavier than company's standard model. Greater mass, larger jaws and wider maximum opening (10 in.) are said to permit positive holding of larger castings, forgings and other pieces. Slight foot pressure rapidly closes or opens jaws and locks them in either position. Air regulator and gage provide jaw pressures from zero lb to 50 times available air pressure. Adjustable safety screw permits quick limiting of vise jaw travel, preventing complete jaw closure.

Goggle: Watchmoket Optical Co., 232 West Exchange St., Providence 3, R. I.—Molded frame goggle is designed to fit comfortably over all types of prescription glasses. Shatterproof plastic lenses are said

to exceed federal specifications for impact-resisting goggles. Frame or lenses can be replaced quickly at low cost. They provide a universal fit and are light in weight for wearing comfort.

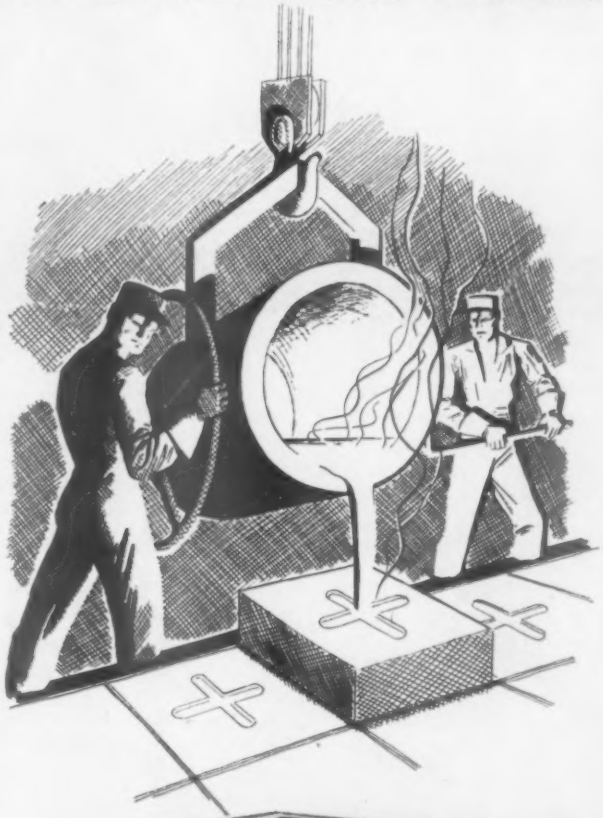
Blowpipe: Weldit Inc., 990 Oakman Blvd., Detroit 6—Gas-air blowpipe is designed for use with manufactured or natural gas, propane and compressed air on heating, annealing or soldering operations. It is made of aluminum alloy and is

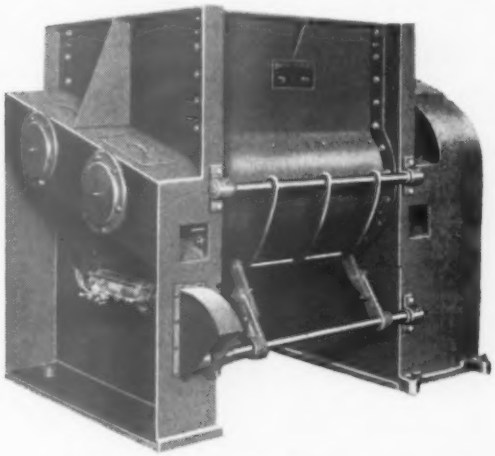
(*Concluded on page* 250)



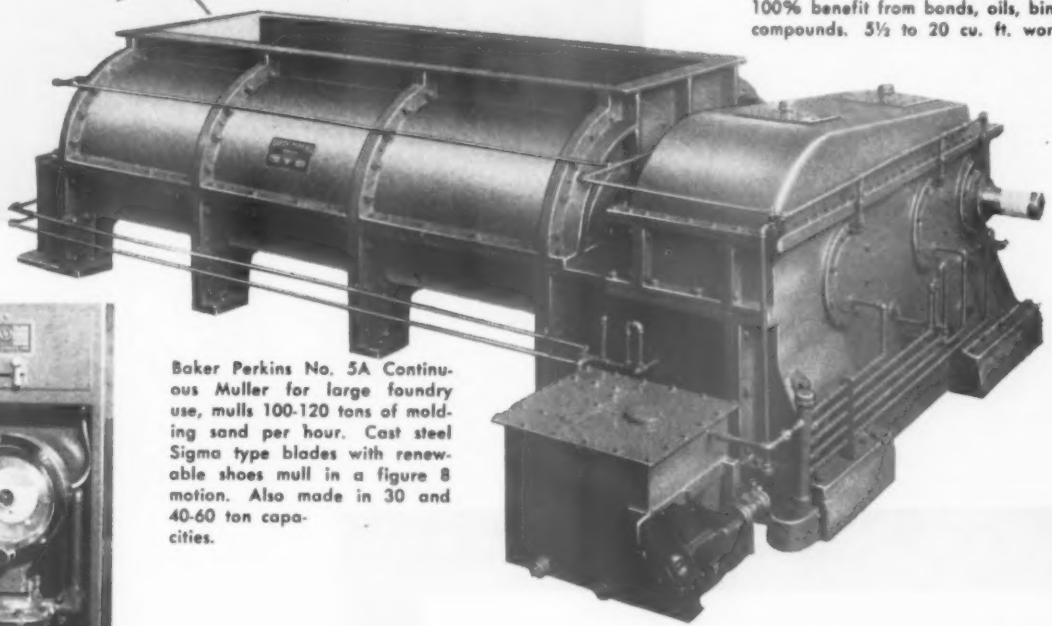
FOR BETTER CASTINGS, USE BETTER SAND MIXERS

One sure way to produce better castings is by improving your core sand. Baker Perkins foundry equipment can help you do this important job. Baker Perkins continuous mullers, batch-type core sand mixers, liquid meters, and traveling sand scales are doing an efficient job in a great many of America's most successful foundries. Any one or all of these units may be integrated into your production system to help you reduce the percentage of faulty castings and thus help increase your profits. Our engineers will be glad to study your requirements and make specific recommendations.

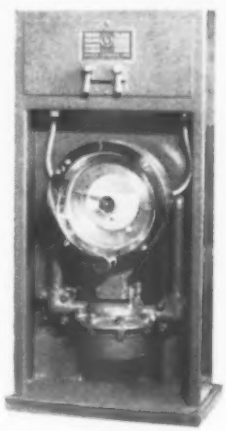




Baker Perkins "Unidor" Core Sand Mixer. Rubs, stirs, and kneads in one operation. Distributes a thin layer of bond around each grain, assuring 100% benefit from bonds, oils, binders, and other compounds. 5½ to 20 cu. ft. working capacities.



Baker Perkins No. 5A Continuous Muller for large foundry use, mulls 100-120 tons of molding sand per hour. Cast steel Sigma type blades with renewable shoes mull in a figure 8 motion. Also made in 30 and 40-60 ton capacities.



Baker Perkins Liquid Meter for accurately and automatically measuring water or binding oil flowing into each B-P Core Sand Mixer. Simple! — just dial the amount of liquid desired and the control mechanism does the rest. Capacities up to 600 lbs.

BAKER PERKINS INC.

FOUNDRY EQUIPMENT SALES

SAGINAW, MICHIGAN

"RAPID" MOLDING MACHINES

★

PORTABLE JOLT SQUEEZER R9X

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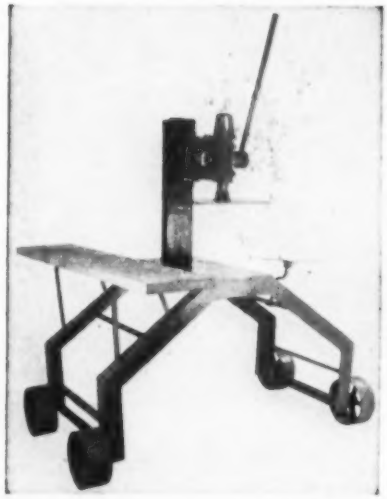


PORTABLE HAND SQUEEZER R-10

PIONEER MANUFACTURING CO.

Molding Machine Manufacturer for Over 20 years

MILWAUKEE (West Allis) WISC.

(*Concluded from page* 248)

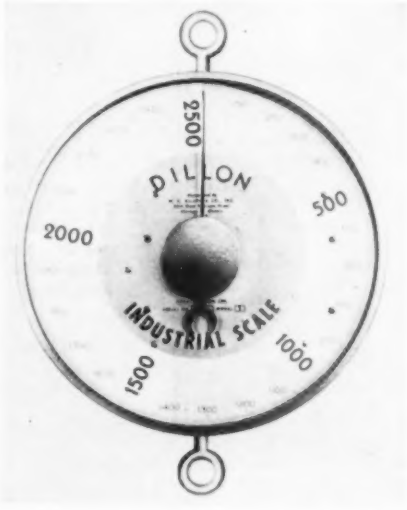
said to be well balanced. During idle moments in operations, the flame is automatically reduced to a small pilot light. When operator grasps handle to resume work, the blowpipe relights instantly at original adjustment. Special control adjustments compensate for fluctuating gas and air flow both on the pilot light and main flow.

Conveyor: Howard Engineering & Mfg. Co., 2235 Buck St., Cincinnati 14 — Parts conveyor, using a patented steel link type conveyor belt is 8 ft. 6 in. long and has a belt 16 in. wide. Loading height is variable from 9 to 24 in.; discharge height is adjustable from 33 to 70 in. Longer or shorter units with a range of belt widths can be furnished to order. Standard unit is driven by a ¼-hp gearhead motor, providing a belt surface speed of 40 fpm. Other speeds and variable speed drives can be furnished. Belt is carried on antifriction, self-aligning bearings. Wheels to permit ready movement of the unit can be furnished.

Generator: Harnischfeger Corp., Welding Division, 4400 West National Ave., Milwaukee 14—Three-hundred amp bare welding generator has welding service range of 30 to 375 amp. It is designed for easy coupling to a gasoline engine or power take-off. V-belt pulley arrangement makes exact alignment between power and generator unnecessary. One control selects desired welding heat within the machine's entire range.

Testing Machine: Steel City Testing Machines Inc., 8843 Livernois, Detroit 4—Brinell testing machine is said to be capable of checking up to 800 pieces per hour of parts varying in diameter and thickness as much as ¾-in. without moving the elevating screw. Machine is motor driven, hydraulically operated and so constructed that it is impossible for the operator to remove the specimen being tested before the full load has been applied to the penetrator. It is equipped with a comparator indicator which eliminates the necessity of using the brinell microscope on production testing. Throat opening is 6 in. and maximum vertical opening is 14 in. Standard equipment includes flat and V-type anvils.

Scale: W. C. Dillon & Co. Inc., 5410 West Harrison St., Chicago 44—Portable industrial scale is designed to give accurate readings within 1 per cent or better. Scale has 15-in. diam face and is made of heavy gage steel with the mechanism enclosed to keep out dust, dirt, oil and other foreign material. Operating on the principle of the bending of a beam from a true straight line, the instrument needs no adjusting or oiling and is said to remain accurate for years. Mechanism automatically cuts out in the event of an accidental overload when the top capacity of the scale has been reached. Scale is available in a top range of 0 to 10,000 lb.



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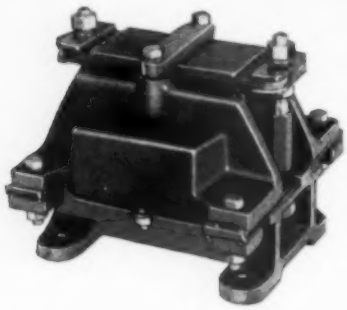

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ASTM AND FOUNDRY INDUSTRY

(*Continued from page* 87)

in the field of cast iron. This work is under the jurisdiction of ASTM Committee A-3 on Cast Iron of which Dr. J. T. MacKenzie, American Cast Iron Pipe Co., has been chairman since 1940. This activity started originally as Committee B with Walter Wood, R. D. Wood Co., as chairman. Foundrymen will recall that he was vice president of AFA between 1909 and 1916. He was chairman of Committee A-3 from its organization in 1903 as Committee B until 1914, while Dr. Moldenke, whom we have mentioned previously, was secretary. In 1914 Dr. Moldenke succeeded Mr. Wood as chairman of A-3 and served in that capacity until 1926.

Pig Iron Graded by Fracture

Prior to the formation of Committee B (which, as its designation indicates, was the second committee formed by ASTM) foundry pig iron had been graded solely on the appearance of fracture of the metal. With active co-operation of AFA and ASTM, Messrs. Wood and Moldenke took steps to correct this unsatisfactory situation. A subcommittee on specifications and grading of pig iron was organized in 1902-3 with Edgar S. Cook, Warwick Iron & Steel Co., Pottstown, Pa., as chairman. A specification grading pig iron by chemical analysis with four grades of decreasing silicon and increasing sulphur was presented to the society and adopted in 1904. In 1908 the specification was amended to cover six grades, with silicon, sulphur, phosphorus and manganese specified, and from this has developed today's comprehensive specification for Foundry Pig Iron (A 43) which covers 284 standard grades of nine types.

The enthusiasm with which Messrs. Wood and Moldenke started ASTM work in specifications for cast iron is shown by the fact that four other specifications were issued immediately after those covering foundry pig iron. These were for cast iron pit-cast pipe (A 44), cast iron locomotive cylinders (A 45), cast iron car wheels (A 46) and a general specification for gray iron castings (A 48), and were developed by other subcommittees of Committee B, of which the chairmen were, respectively, Mr. Wood, H. V. Willie of Baldwin Locomotive Works, Charles B. Dudley of the Pennsylvania Railroad (founder and first president of ASTM) and Thomas D. West of Sharpsville, Pa. Among other well known names in the roster of subcommittee chairmen in those early days were Albert Sauveur, Albert L. Colby (of International) and Henry Souther. A 44 and A 48, with revisions to bring them up to date, are still current specifications in ASTM and, in addition, a number of other specifications of interest to the industry have been written, including a specification for automotive gray iron castings (A 159) and one for pressure-containing parts for temperatures up to 650 F. (A 278).

In 1929 Committee A-3 sponsored a Symposium on Cast Iron, the chairman of which was Hyman Bornstein, Deere & Co., (and AFA representative on A-3 of which he was chairman, 1928-1936). Important contributions to this symposium were papers by John Bolton, the Lunkenheimer Co.; by R. S. MacPherran (who had just served a term as chairman of A-3); by J. T. MacKenzie (now chairman of A-3); by W. H. Rother and V. M. Maguire, Buffalo Foundry & Machine Co.; by F. B. Coyle, International Nickel Co.; by A. L. Boegehold, General Motors Corp.; by Mr. Bornstein (the chairman) and several others.

Malleable Iron—Committee A-7 on Malleable Iron Castings is another ASTM committee working very closely with the foundry industry. The present chairman of the committee is W. A. Kennedy, the Grinnell Co., and J. H. Lansing of the Malleable Founders' Society is secretary. A-7 was constituted a separate committee in 1918 with H. E. Diller of the Erie Works, General Electric Co., as chairman (1918-1924) and then W. P. Putman of Detroit Testing Laboratories (1924-1936) with Enrique Touceda of the MFS as secretary during both of their terms of office.

Before that a subcommittee on malleable castings had been established in 1903 as part of Committee A-3. The original chairman of this subcommittee was Stanley G. Flagg Jr., and the first specifications for malleable iron castings (A 47) were issued in 1904, the same year in which the original specifications for cast iron referred to above were published. This specification with suitable revisions is still in force, and specifications have also been written for cupola malleable iron (A 197) and pearlitic malleable iron (A 220) and a specification for malleable iron flanges, pipe fittings and valve parts (A 277).

Two symposiums on malleable iron have been sponsored by this committee. The first of these was a joint ASTM-AFA presentation on

(*Continued on page* 254)

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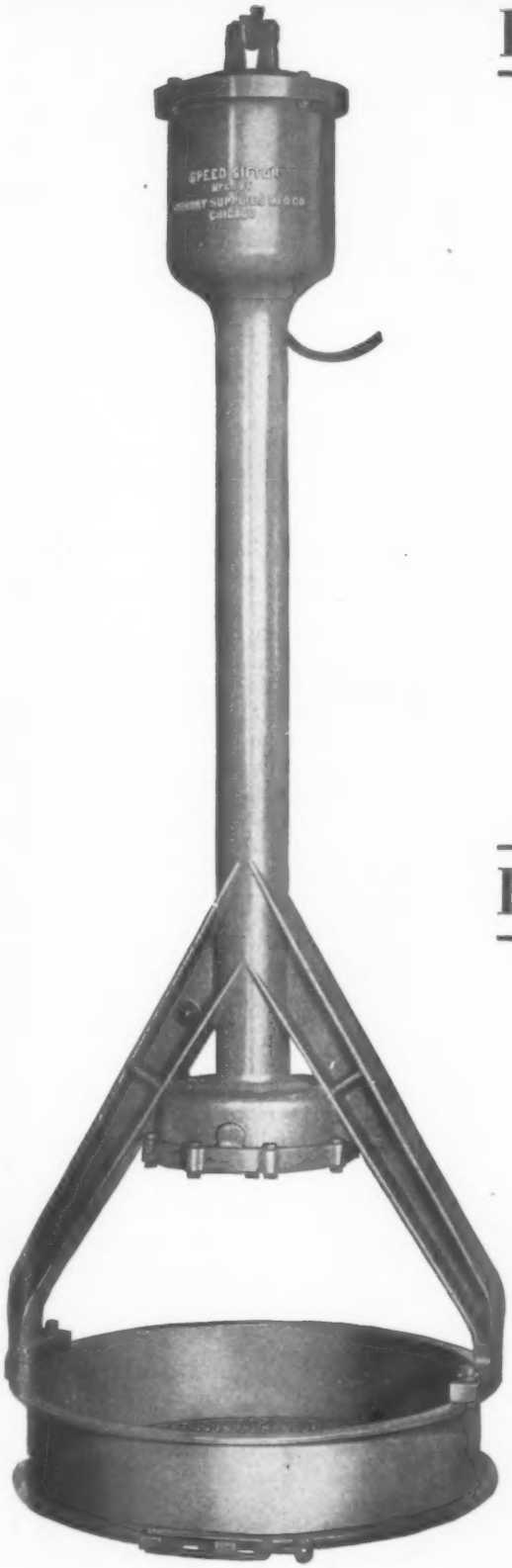

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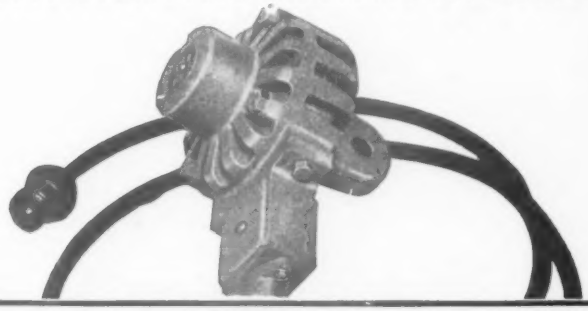

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(*Continued from page* 252)

the manufacture and properties of cast iron with the committee in charge including C. L. Warwick (of ASTM), R. E. Kennedy (of AFA), W. P. Putnam (of Detroit Testing Laboratories), F. M. Robbins (of Ross-Meehan Foundry, Chattanooga), H. A. Schwartz (of National Malleable & Steel Castings Co. who was secretary of Committee A-7 from 1936 to 1947), Enrique Touceda and others.

The second A-7 symposium was held in Cleveland in 1936 on the subject of pearlitic malleable iron with Prof. H. M. Boylston of Case School of Applied Science as chairman of the symposium committee. He was assisted by H. A. Schwartz, Fred Wolf (long with the Ohio Brass Co. and chairman of A-7 from 1940 to 1942) and R. E. Kennedy.

Copper-Base Alloys — Among the original members recorded as forming the ASTM in 1902 one will find the name of the Ajax Metal Co. represented by G. H. Clamer. Thus enters the written record of ASTM work in the nonferrous foundry field one of the best-known names in both ASTM and AFA for nearly half a century. Dr. Clamer has served as president of both societies—of ASTM in 1918-1919 and of AFA in 1923-1924—and was the annual foundation lecturer of AFA in 1946.

The 1903 Proceedings of ASTM include a paper by Dr. Clamer on "Testing Bearing Metals" and from that day up to and including the present—and may he long continue to do so—he has played a prominent role in the advancement of the knowledge of nonferrous castings and in the standardization of methods of test and specifications for them.

ASTM Committee B-2 on Non-Ferrous Metals and Alloys was established in 1910 and the next year completed a specification for manganese bronze ingot (B 7). In 1913 the first subcommittee structure in Committee B-2 was established when Subcommittee III, on Sand-Cast Metals and Alloys, with the late W. M. Corse, then with the Lumen Bearing Co. in Buffalo, as chairman and Dr. Clamer a member of the subcommittee. The latter was chairman from 1916 to 1936 of another subcommittee of B-2, Subcommittee VI on Non-Ferrous Alloys for Railroad Equipment.

Between 1915 and 1928 these two subcommittees of B-2 prepared standard specifications for ingot and a number of standard casting alloys, including manganese bronze, nonferrous railroad bearing metals, car and tender journal bearings and bearing and expansion plates for bridges and turntables. Specifications were also prepared for Composition G, Composition M and Ounce Metal with the active cooperation of the Manufacturers Standardization Society for the Valves and Fittings Industry.

In 1928, the subcommittee of B-2 which had covered copper-base alloy castings was transferred to the newly formed Committee B-5 on Copper and Copper Alloys with the Subcommittee on Castings headed by N. K. B. Patch of Lumen Bearing Co. In 1932 Dr. Clamer became chairman of this subcommittee, a position he continues to hold. This subcommittee made a thorough review and rationalization of all the ingot and casting specifications and established in 1940 and 1941 a comprehensive ingot specification (B 30) and a series of casting specifications covering various alloys (B 143 to B 149, inc., and B 198). The Classification of Cast Copper-Base Alloys (B 119) on which these new specifications were primarily based (developed through the efforts of Sam Tour) had been issued in 1939.

Standardize Specifications

During the war the need for standardization of specifications for these nonferrous alloys as they had been written by various specification-writing bodies became quite apparent. When ASTM first started work in standardization in this field there were no less than forty different "prescriptions" for ounce metal or 85-5-5-5. In 1943 and 1944, working largely through the technical knowledge available in Dr. Clamer's subcommittee, a standardization of chemical composition and physical requirements was achieved, with the ASTM, Federal, Navy and SAE specifications for the standard alloys now in practical agreement in all major details.

A current project now under way in Dr. Clamer's subcommittee deserves special mention. This is an effort to review and standardize test bar procedure for copper-base alloy castings, including not only the design of the test bar but the matter of gating, pouring, temperature, etc. A wealth of material has been made available to the committee from tests which have been run by the Navy at Annapolis and at Battelle Memorial Institute under the auspices of the NFIMI (now the Brass and Bronze Ingot Institute) and by other foundries, including the MSS group (now represented on the committee by J. W. Bolton, J. J. Curran and J. J.

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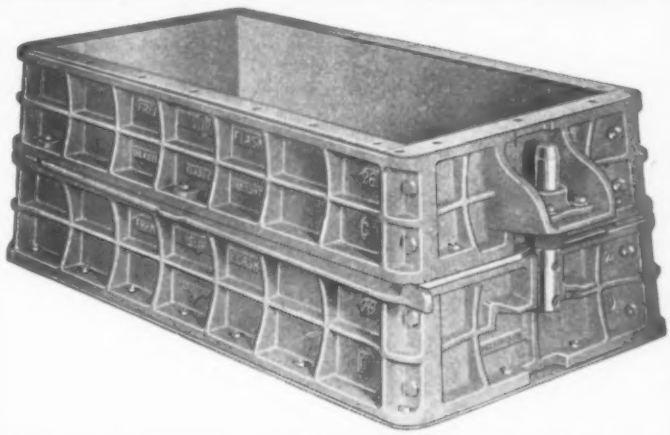
Cast Iron

JACKETS

Are Best by Test



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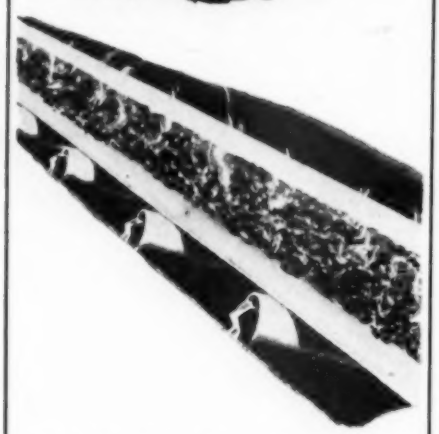

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(*Concluded from page* 254)

Kanter).

Light Metals — Committee B-2 of ASTM also started the first work done in the society on light metals with the organization in 1917-18 of a subcommittee chairmanned at first by P. D. Merica, then at the National Bureau of Standards, and later by E. Blough, of the Aluminum Co. of America. The first specification for aluminum alloy sand castings (B 26) was written in 1918 shortly after the subcommittee had been organized. But the next specification in the foundry field was not written until some time later, in 1926, when a specification for aluminum-base alloy ingot (B 58) was issued. This has now been replaced by the comprehensive new specification (B 179) which covers the standard aluminum-base alloys in ingot form for sand castings, die castings and permanent mold castings.

In 1928, Committee B-7 on Light Metals and Alloys was formed with the former subcommittee of B-2 as the nucleus, and I. V. Williams of the Bell Telephone Laboratories is now chairman of this committee with J. J. Bowman, Aluminum Co. of America, as secretary. R. A. Quadt, the American Smelting & Refining Co., is chairman of the subcommittee on aluminum and aluminum alloy ingots, Don Colwell, Apex Smelting Co., is chairman of the subcommittee on aluminum alloy castings and R. G. Thompson, General Electric Co., is chairman of the subcommittee having magnesium castings under its jurisdiction. A specification for magnesium-base alloy sand castings (B 80) was written in 1930 and an ingot specification for magnesium-base alloys (B 93) in 1934. The specifications for aluminum-base permanent mold castings (B 108) was written in 1936.

The work on die castings also originated in a subcommittee (XV) of B-2 organized in 1927 under H. A. Anderson, Western Electric Co. This subcommittee was reconstituted as Committee B-6 on Die Cast Metals and Alloys in 1930 with Harvey Anderson as chairman. J. R. Townsend, Bell Telephone Laboratories, is now chairman of the committee. The chairman of the subcommittee on aluminum-base die casting alloys is J. J. Bowman, Aluminum Co. of America, and on magnesium-base die-casting alloys, V. D. Sweeney, Apex Smelting Co.

Specifications for aluminum-base alloy die castings (B 85) were written in 1931; for magnesium-base alloy die castings (B 94) in 1934 and for magnesium-base permanent mold castings (B 199) in 1945.

All these specifications for aluminum- and magnesium-base alloys have been reviewed periodically and kept up to date and a large measure of standardization in this field has also been accomplished.

Coke—Another field of close co-operation between ASTM and the foundry industry is found in the work covered by Committee D-5 on Coal and Coke. The committee covering coke started its activities in 1904 as Committee J, with the team of Wood and Moldenke serving as chairman and secretary. However, this subject was fully covered by D. E. Krause and H. W. Lownie Jr. in their paper presented at the 1947 AFA convention in Detroit and need not be repeated here.

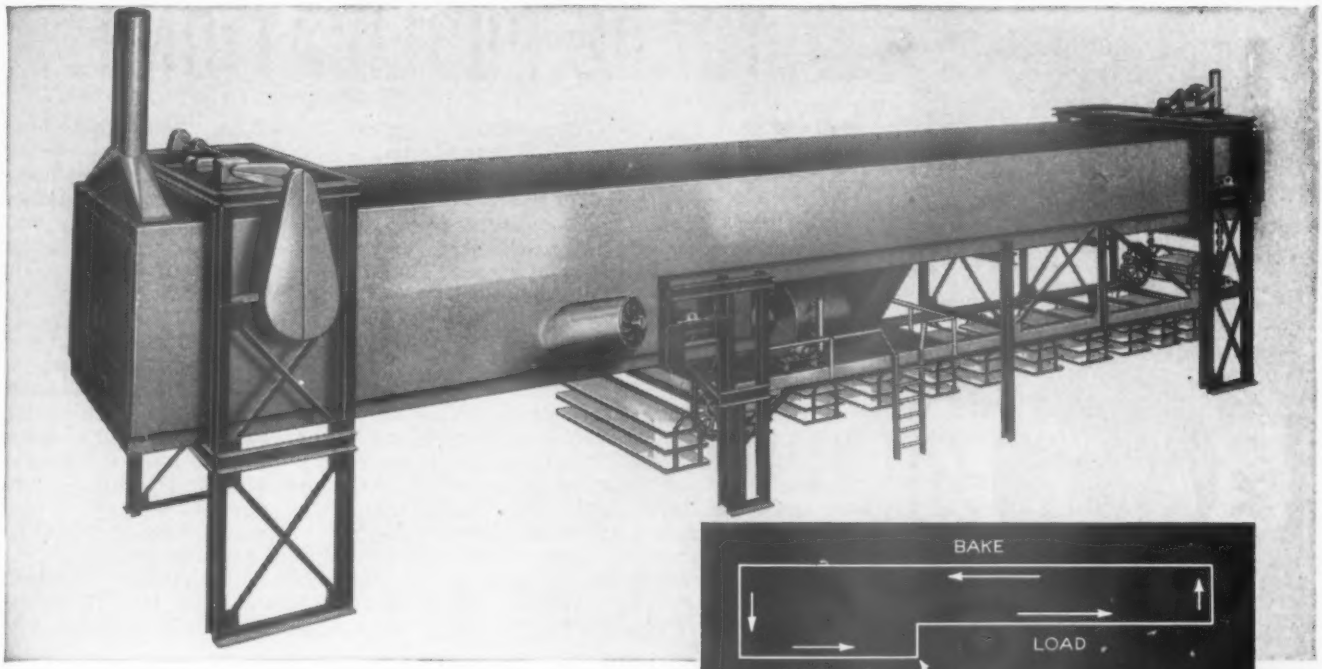
Headquarters Co-operation — Any story of the co-operation between ASTM and the foundry industry would be incomplete without mentioning the close co-operation that has existed throughout the past half century between the headquarters staffs of the ASTM and AFA. This started actively, as has been indicated, in the days of Dr. Moldenke and continued through the term of office of R. E. Kennedy into the time of the present secretary of AFA, W. W. Maloney, and S. C. Massari, the technical director of AFA. On the ASTM side, the co-operation, of course, started while the late Edgar Marburg was secretary-treasurer and continued under the guidance of C. L. Warwick, now executive secretary of ASTM and R. E. Hess, the technical secretary of the society.

Committee To Study Hot Tear Causes

The first project sponsored by the Steel Division research committee of American Foundrymen's Association will be a study of the influence of mold conditions on the development of hot tears in steel castings, AFA Technical Director S. C. Massari has announced.

A thorough investigation into the relationship of such factors as mold collapsibility, sand grain size, moisture content, sand binders, mold hardness and hot strength to the occurrence of tears, will be directed by the committee. The study will also involve the design of a pattern to serve as a measure of the tear susceptibility of various steels.

Clyde Wyman, metallurgist, Burnside Steel Foundry Co., Chicago, is chairman of the research group.



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BLOWERS: Roots - Connersville Blower Corp., 803 Madison Ave., Connersville, Ind.—Bulletin 120-23-B11 covers rotary positive and centrifugal type foundry cupola blowers. A table gives melting rate, with air volume and pressure required, for standard size cupolas. Additional tables, performance curves, diagrams, text and photographs supply information on blowers and blower installations.

X-RAY MATERIALS: Eastman Kodak Co., X-ray Division, 343 State St., Rochester 4, N. Y.—Illustrated catalog lists materials and accessories for industrial radiography. Included are films, exposure holders, intensifying screens, chemical preparations for processing, darkroom accessories and viewers. A chart indicates the relative speed and contrast of different types of x-ray films for computing exposure.

ELECTRODES: Arcos Corp., 1515 Locust St., Philadelphia 2—Bulletin 1047 provides information on base metal identification of solid and clad materials, recommended types of electrodes, special considerations involving corrosion, heat or strength properties, and suggestions for welding dissimilar metals. Chart of the trade names of stainless alloys produced by the country's mills is included.

FLAME GOUGING: Linde Air Products Co., 30 East 42nd St., New York 17—Booklet describes the flame gouging process which is intended to provide an easily controlled means for quickly and accurately removing a narrow strip of surface metal from steel plate, forgings and castings. Equipment is described and instructions in the technique for different applications are provided.

GROUND SURFACES: Norton Co., 1 New Bond St., Worcester 6, Mass.—Booklet, "Injury in Ground Surfaces," features photographs which show the numerous types of defects, such as cracks and burns, that are sometimes found in ground surfaces. It deals with the practical aspects of grinding, discussing methods of detection and causes of surface injury.

PRODUCTION CONTROL: Chronolog Inc., National Bank Bldg., Detroit 26—Bulletin EM-48-C describes and illustrates a machine which records, at preselected intervals, when, for what cause and how long a machine is idle. The tabulated production record also indicates the number of units produced (feet or pieces) and the productive time required.

ALUMINUM ALLOYS: Acme Aluminum Alloys Inc., 252 North Findlay St., Dayton 3, O.—Separate folders contain technical data on two aluminum-magnesium alloys. One is known as Almag 35 and is said to have higher physical properties in the as-cast condition than most heat treated aluminum alloys previously available. Of its Almag 55 the company claims the highest combination of ultimate strength, ductility, and impact resistance of any cast aluminum alloy.

ELEVATORS: Otis Elevator Co., 260 Eleventh Ave., New York 1 — Booklet describes freight elevator features designed to absorb punishment from power-driven materials handling equipment. Strengthening platform frame and diagonal bracing, special flooring, construction of car frame, use of special hoisting machines, full automatic elevator control and automatic micro self-leveling are discussed and illustrated.

BUSINESS LOCATION: Cleveland Electric Illuminating Co., 75 Public Square, Cleveland 1—Publication sets forth in words and pictures the advantages Cleveland offers as headquarters for management of national or regional business. The confidential planning service offered by the company's Development Division to managements of companies is described.

EAR PROTECTOR: Industrial Products Co., 2820 North Fourth St., Philadelphia 33—Leaflet describes a new type ear protector which is said to be a simple solution to the problem of industrial noise. Charts show the standard method of measuring loudness of sound and this information is applied to various classes of work having occupational noise problems.

BUTTERFLY VALVES: Henry Pratt Co., 222 South Halsted, Chicago 8—Catalog A provides detailed description and specifications of the company's rubber seat butterfly valves and accessories. Designed for engineers, the book emphasizes actual blueprint reproductions for reference to work in progress.

INDUSTRIAL OVENS: J. O. Ross Engineering Corp., 350 Madion Ave., New York 17—Bulletin 132 illustrates 55 different types of industrial ovens. It covers oven construction, method of heating, source of heat, and material handling.

OIL VALVE: Hauck Mfg. Co., 106 Tenth St., Brooklyn 15, N. Y.— Bulletin 707 presents details on a self-clean metering oil valve. This valve is for regulating the flow of oil to any type of oil burner.

ELEVATOR: Allis-Chalmers Mfg. Co., 1126 South 70th St., Milwaukee 1—Bulletin 06B6878 describes and illustrates service elevator for transportation of material or people to heights of 200 ft.

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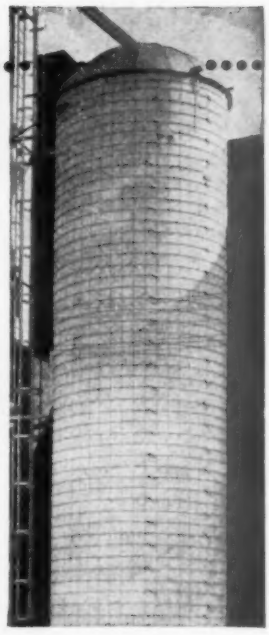
VERTICAL STORAGE

SAVES GROUND SPACE



Where ground is limited, valuable space can be saved by storing flowable bulk materials in Neff & Fry super-concrete stave silos. What's more, conveying distances are shortened, which reduces the cost of labor and equipment.

Neff & Fry staves are dense, smooth, enduring. They interlock to form strong, tight joints. Each tier is bound with high-tension steel hoops. The result is a substantial structure which serves for a generation with virtually no upkeep cost.

Some of the materials now being stored in N & F silos are cement, chemicals, coal, fertilizer, grain, gravel, lime, sand, sawdust, seeds, water, wood pulp.

If you have a storage problem or project, be sure to obtain complete information from us.

The NEFF & FRY Co., Camden, Ohio

NEFF & FRY STORAGE BINS

WHEELS

Electro HIGH SPEED CUT-OFF WHEELS run true. Coarser grits in harder grades do an already speeded-up job even faster. The introduction of Electro HIGH SPEED CUT-OFF WHEELS reduced cutting time from minutes to seconds. Achievement of wheel truth freed us from grit limitations so that we could give you more speed with greater safety in wheels that run cool and leave a satisfying finish on both sides of their precision cuts. Send for free copy of Grinding Wheel Manual 645 with color photos.

Service from Los Angeles or Buffalo

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Electro REFRACTORIES & ALLOYS CORPORATION

Mfrs. • Refractories • (High Speed Grinding Wheels) • Crucibles • Alloys

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QUALITY • DEPENDABILITY • SERVICE

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highest FOUNDRY *quality*

Prompt shipment—unlimited quantities now available to foundries from BAROID—the world's largest producer of Bentonite. Our modern plants are geared to fulfill every requirement of the foundry trade.

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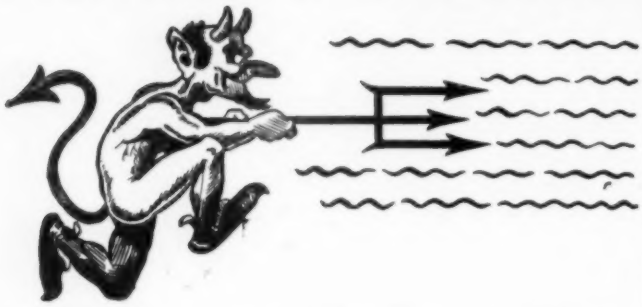
BENTONITE SALES OFFICE: RAILWAY EXCHANGE BUILDING, CHICAGO 4, ILL.

SOFFEL'S FLUXES



For Ferrous and Non-Ferrous Metals

Modern metallurgical research has definitely proved that the use of fluxes in the production of high-quality castings is no longer a luxury, but has become an economic necessity. In the highly competitive market of today, progressive foundries who are enjoying the greatest volume of sales are those who regularly use SOFFEL'S FLUXES in the production of their castings.

Many manufacturers have offered to the trade fluxes advertised as "cure-alls" for all metallurgical evils. Years of experience have taught us that no one flux can be efficient and practical for all types of metals and alloys. Most of these "cure-all" fluxes function only as a slag cover to protect the surface of the metal, and contribute little or nothing to the removal of occluded gases, oxides, and other impurities from the metal.

Through constant study and research into the problems of metal refining, we have scientifically compounded a Flux for every alloy and melting method. SOFFEL'S FLUXES are designed not only to prevent oxidation of the metal during melting, but also to cleanse and purify the metal through their chemical reactions. Metal which has been refined by the use of SOFFEL'S FLUXES will have more fluidity, less shrinkage, and will produce castings of better color and higher tensile strength. Occluded gases and oxides are removed. Linings of furnaces, ladles, and crucibles will stay clean and last longer. We also manufacture Fluxes for removal of aluminum and iron contamination from brass, bronze, and copper; and for removal of magnesium contamination from aluminum.

For refining aluminum and its alloys, SOFFELITE ALUMINUM FLUXES are unexcelled. They will produce a high degree of fluidity and remove aluminum oxide and iron from the metal. Sound, clean castings are produced with the use of SOFFELITE which are free from shrink cracks, gas holes, and misruns. Questionable scrap can be refined and cast into quality castings of higher tensile strength with SOFFELITE. Metal loss in dross skimmings is prevented.

Try our Soffel's Mold Coatings for permanent mold and die casting; also Klen-Zinc Flux for zinc and white metals to remove iron and sulfur.

Descriptive literature will be mailed upon request. Our metallurgical research department is at your disposal. We invite your inquiries relating to melting or casting difficulties. Sales Representatives in all Principal Cities of the United States; also Progressive Foreign Countries. Manufacturers of Famous Carbon-Free Liquidizer, an Exothermic Head Compound, and THERMOTOMIC FEEDING COMPOUND FOR CASTINGS.

PITTSBURGH METALS PURIFYING CO.

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A BLAST FURNACE PRODUCT

Smelted from Superior quality lake ores, high grade metallurgical coke and limestone, using our own local No. 1 Sharon Seam coal.

A "blend" with JISCO is sound metallurgy.

HIGH SILICON IRON JISCO

THE JACKSON IRON & STEEL Company

JACKSON, OHIO

melt metals

WITH EASE and CONFIDENCE

DFC STATIONARY TYPE MELTING FURNACES

(Gas or Oil Fired)

Designed for melting any non-ferrous metal that melts under 2200° F. Built for all crucible sizes, from 40 through 125.

FEATURES:

- **Heat is circulated top to bottom, bottom to top and circumferentially insuring even distribution of heat throughout crucible.**
- **Tangential firing.**
- **Heavy, substantial refractory lining which saves heat loss.**
- **Few wearing parts.**

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DENVER, COLO. U.S.A.

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ACCEPTED

BY AMERICA'S LARGEST INDUSTRIAL PLANTS TO DO THE TOUGHEST BLASTING AND PEENING OPERATIONS

HI-GRADE METALLIC

FAMOUS

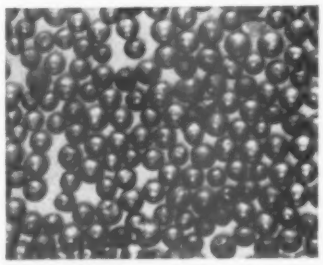
FOR ITS ABILITY TO STAND UP UNDER REPEATED HARD USE

SHOT

- ROUND
- UNIFORM IN SIZE
- UNIFORM IN HARDNESS
- LACKS IRREGULAR SHAPES

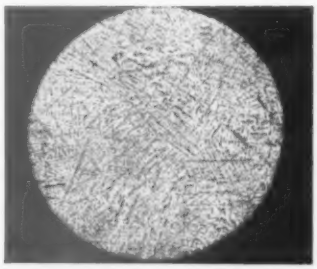
GRIT

- RECTANGULAR
- SHARP
- TOUGH
- DURABLE



UNRETOUCHED PHOTO OF HI-GRADE SHOT

CLAYTON-SHERMAN ABRASIVES COMPANY
3896 LONYO ROAD
DETROIT 10, MICHIGAN
CEdar 7200



MICROSCOPIC STRUCTURE OF METAL

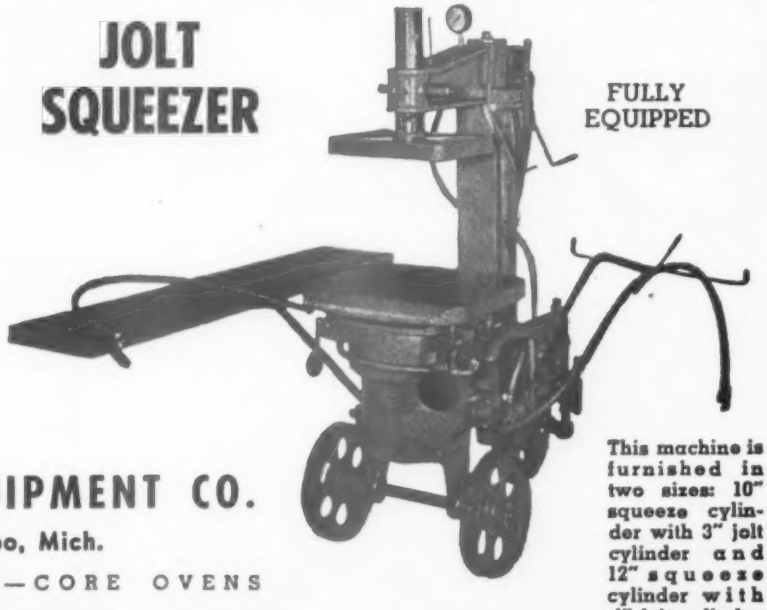
HAYNES EQUIPMENT

JOLT SQUEEZER

FULLY EQUIPPED

● The post and squeeze cylinder on the HAYNES JOLT SQUEEZER is cast all in one piece. There are no bolts or screws in this machine. The top of the post is machined on top with a 2 7/16" cold rolled shaft which the swing arm swings on.

This is a portable machine with three wheels, two in front, one in back, zerk fittings on all moving parts. Comes equipped with air gauge, pop-off gauge and a pin on top of the arm for a gate horn.



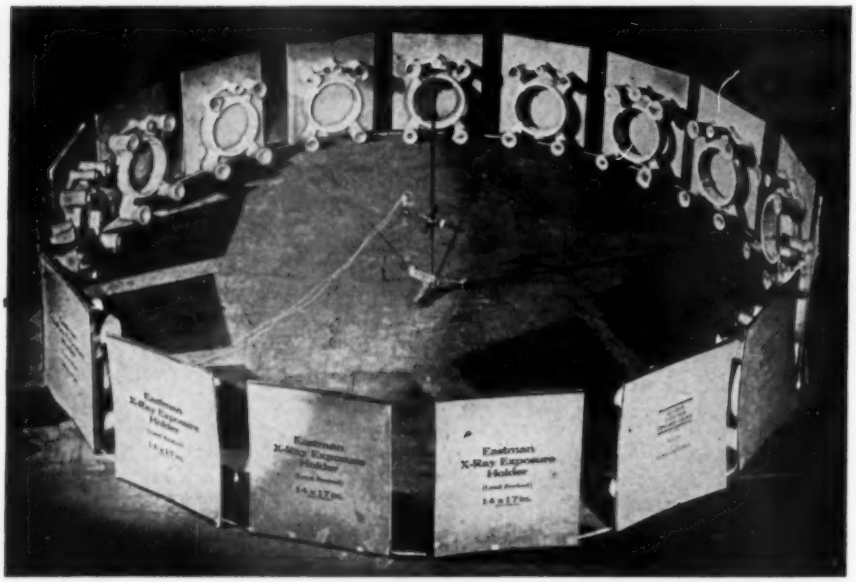
This machine is furnished in two sizes: 10" squeeze cylinder with 3" jolt cylinder and 12" squeeze cylinder with 4" jolt cylinder.

HAYNES FOUNDRY EQUIPMENT CO.

814 Ada Street—Kalamazoo, Mich.

LADLES—BRASS FURNACES—CORE OVENS

RADIUM RADIOGRAPHY *Performs a* NEW FUNCTION



PHOTOGRAPH COURTESY OF CRANE CO.

Write us concerning any problem of Gamma Ray Radiography

"Directional solidification" can easily be studied by the set-up illustrated in the photograph—to indicate the best method of casting with a minimum of defects in the casting itself.

Radium has become a new foundry tool which directly effects an increase in yield. It permits accurate determination of the proper procedure in gating and risering "tough" castings. Seventeen cylindrical castings were radiographed simultaneously by Crane Co. to ascertain the most productive and economical foundry practice.

Radium thus performs a valuable additional function.

For inspection, for determination of directional solidification, Radium is available in capsules of various unit strength in duralumin holders which may be leased or purchased at low rates.

The rental includes full coverage insurance; heavy load storage containers and slide rule exposure calculators.

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MURPHY PISTOL SPRAYER
ELIMINATES SWAB, BRUSH and SPRAY CAN

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MOLDS ARE BLACKENED FASTER
CASTINGS PEEL BETTER
WORK COMES CLEANER
Satisfactory Performance Guaranteed or Money Back

PRICES COMPLETE WITH SUCTION HOSE AND SINKER

PIPE SIZE	1/16"	1/8"	1/4"	3/8"	1/2"
PRICE F. O. B. HAMILTON, O.	$12.00	$12.00	$12.00	$14.50	$18.00

Used for Silica wash, oil, water or any liquid material. For sand-blast cleaning. As a blow gun for cleaning motors and machinery. If your dealer cannot supply you at once, order direct from manufacturer below. Literature on request.

GUARANTEED COMPRESSED AIR PRODUCTS

AFTERCOOLERS • SEPARATORS • STRAINERS • TRAPS
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Moisture Elimination Up To 3000 Pounds Per Square Inch

CUT HIGH LABOR COSTS

Get more for your labor dollars by cutting out slow, expensive hand methods of handling all bulk materials.

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. . . cut labor time and fatigue in half. Easy to fill at source, move with any standard fork or platform lift truck, trip and let them automatically dump, right and lock, ready for another load. They are QUICK, SAFE, ECONOMICAL.

Write today for detailed bulletin "In Dollars & Sense" showing types and sizes for any job.

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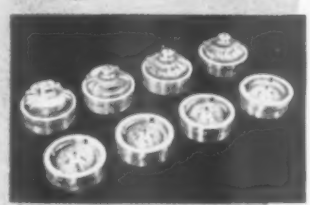
Name It...

ACME'S PATTERN DIVISION CAN HANDLE IT

Acme has the complete facilities to handle your entire pattern job with faster deliveries, greater efficiency. Typical large job is that illustrated above—cope and drag aluminum pattern equipment for diesel engine alternator stator frames. Cope half was machined in one piece; drag half machined in 8 sections and assembled on drag plate.

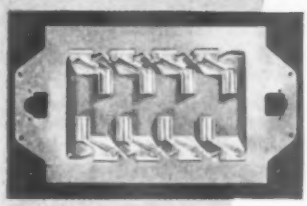
• Acme can take the complete assignment—any size or any quantity—from raw idea to finished castings. Make Acme your source for cope and drag plates—core boxes—match plates—precision castings in aluminum, brass, and bronze —etc. Our 18th year as pattern specialists.

Sand • Plaster • Permanent Mold



Interchangeable Pattern Inserts

Completely machined brass cope and drag pattern inserts for motor end frames. Hi-accuracy permits interchangeability.



Aluminum Match Plates

Single or multiple sections from one master pattern. Precision cast. Low clean-up time.

SEND BLUEPRINTS FOR PROMPT QUOTATIONS

PATTERNS by Acme

ACME ALUMINUM ALLOYS, INC.
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Blast Cleaning Cost Hits Rock Bottom

So hard, so tough, so carefully graded, that you get the utmost in cleaning efficiency and economy. *Write for samples and price list.* IMMEDIATE SHIPMENT.

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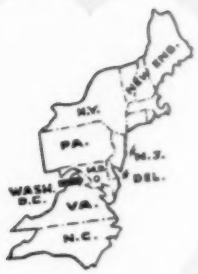
If you are located in the area comprising "the heart of the Foundry Industry in The East" . . . from the Canadian line to the Carolinas . . . we should get together. We carry everything for The Foundry and we are only overnight away from you by either rail or truck.



PENNSYLVANIA FOUNDRY SUPPLY & SAND CO.
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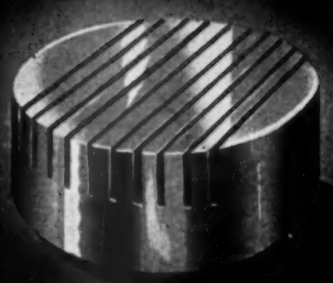
Precision



CORE BOX VENTS

Here's part of a complete line of DEMMLER core box vents—rigidly constructed in varying sizes of slotted brass—slotted steel—and screen mesh. Orders filled promptly from stock!

BRASS SLOTTED CORE BOX VENTS
Slot widths: .010", .013", .015"
Diameters: 1/8", 3/16", 1/4", 5/16", 3/8", 7/16", 1/2", 5/8", 3/4", 7/8", 1", 1 1/4", 1 1/2"

STEEL SLOTTED CORE BOX VENTS
Slot widths: .010", .013", .015"
Diameters: 1/8", 3/16", 1/4", 5/16", 3/8", 7/16", 1/2", 5/8", 3/4", 7/8", 1", 1 1/4", 1 1/2"

SCREEN TYPE CORE BOX VENTS
Mesh: #30, #40, #50.
Diameters: 1/8", 3/16", 1/4", 5/16", 3/8", 7/16", 1/2", 5/8", 3/4", 7/8", 1", 1 1/4", 1 1/2"

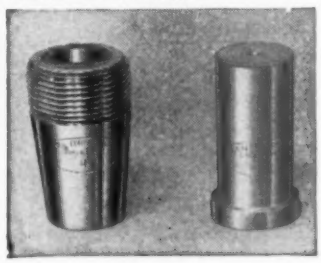
SPECIFICATION CIRCULAR ON REQUEST

Wm. **DEMMLER** *& Bros.*
Kewanee, Illinois

BLAST CLEANING NOZZLES

Saves AIR

Saves SHOT, GRIT SAND



FEDERAL BLAST NOZZLES ARE MADE OF
TUNGSTEN-CARBIDE

"The hardest material known to man." For this reason they outwear ordinary nozzles in use for sand blasting and metal cleaning by the blast method. Air consumption is reduced and the blast is *concentrated* because the hole in the nozzle wears very slowly. This means low cost operation.

TRY ONE AND SEE FOR YOURSELF—Made in all sizes and types: adapters furnished for all types of blast cleaning equipment.

The Federal Foundry Supply Company
4600 E 71st ST CLEVELAND 5, OHIO

For more production . . . better morale . . . *install*

Swartwout Ject-O-Valve

● This modern powered roof ventilator forces out masses of heat, smoke and fumes from foundry, glass plant, forge shop and other work rooms, clears the atmosphere for greater comfort and more efficient operations. Ject-O-Valve eliminates air-contaminating elements before they spread—blasts them *straight up* into the outer air and draws *fresh* air from outer walls where it enters. Force from the powerful propeller fan holds pivoted top open, keeps out weather. Top closes tight—weather-proof—when motor stops.

Carefully engineered in five sizes; varying motor-fan ratings to give you a selection of 28 different capacities. Hinged top permits easy access for servicing.

Swartwout *AIRMOVER* for "open roof" ventilation

For situations where ventilation is *general*, requiring removal of unwanted elements over a wide area, the gravity type AIRMOVER practically opens your roofs to the sky . . . with full weather-protection but minimum air-flow resistance. *Write for Bulletin 324.*

The Swartwout Company
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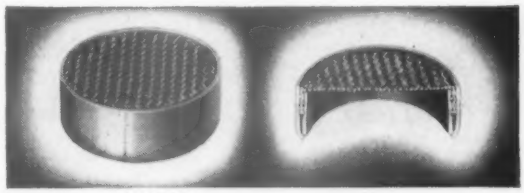
Swartwout *Controlled* **Air Circulation**
EQUIPMENT FOR EFFECTIVE ECONOMICAL VENTILATION OF INDUSTRIAL BUILDINGS

CORE BLOWERS!

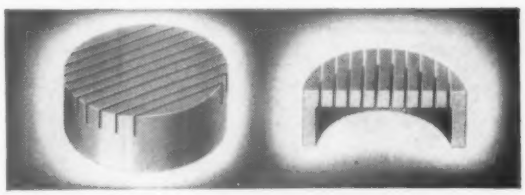
NO BLOWOUTS with RIENACKER CORE BOX VENTS



SCREEN TYPE—Patent No. 2,263,974

For HIGH-SPEED production. Made from 30 mesh monel screen lapped 3/16" over brass innertube and firmly secured with brass outertube, making a strong, fool-proof unit. Each vent is sized through a die assuring accurate fit. The compression between outer and inner tubes holds screen securely in place without slightest danger of blow-out. Costly work stoppages to repair or replace vents are eliminated.

Use Rienacker core vents (screen type) whenever possible—on all flat surfaces, and on curved surfaces wherever core marks are unimportant. You get faster air escape with minimum liability of clogging.



SLOTTED TYPE—Patent No. 2,238,506

For CONCAVE and CONVEX RADII. Made of brass, precision slotted for greatest air escape possible with this type of vent. Standard slot width for cast iron .014; for brass .010. Core vent hole should be made with a step-drill so that bottom of vent rests on shoulder thus provided. This slotted vent is easily shaped to any curved surface; leaves no core marks on casting.

• • •

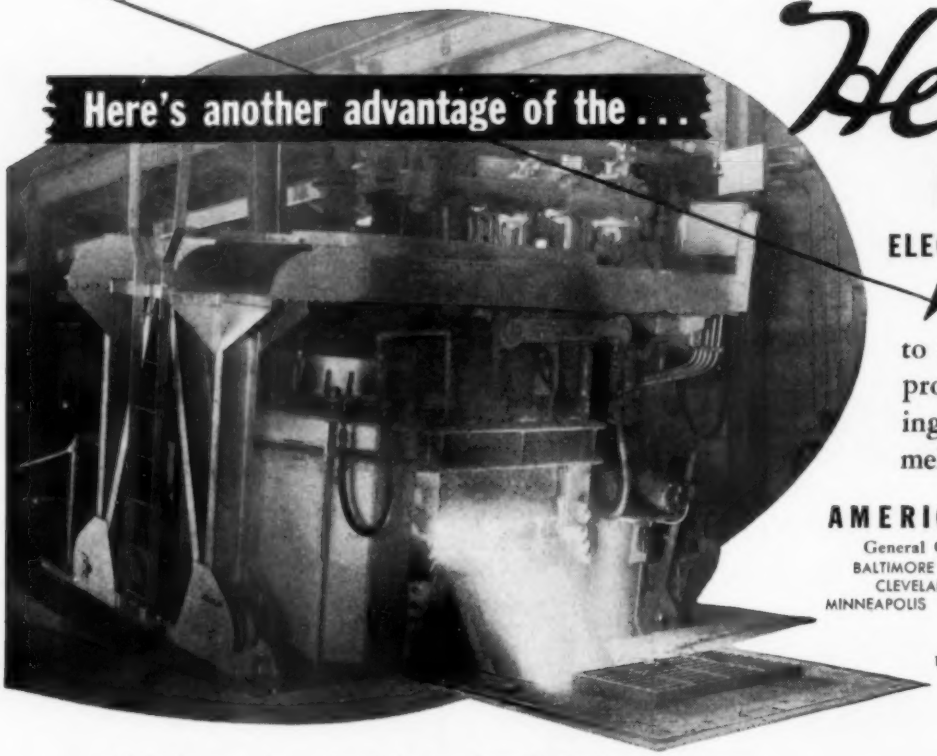
ORDER THROUGH YOUR JOBBER

DEALERS IN ALL PRINCIPAL CITIES

LANDIS MFG. CO.

2035 HILTON ROAD • FERNDALE 20, MICH.

Manufacturers of Rienacker Core Vents



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Heroult

GANTRY-TYPE

ELECTRIC MELTING FURNACE

Platform is attached to and tilts with the furnace, providing continuous working area during charging and melting.

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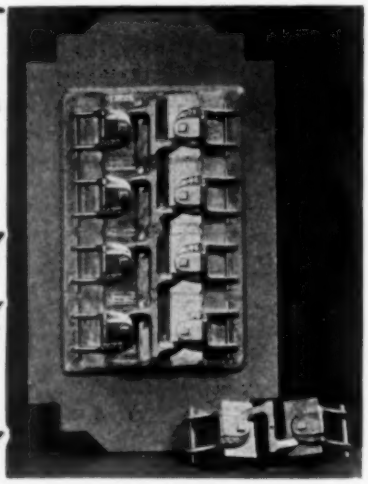
UNITED STATES STEEL

Matchplate made from single-gated pattern



Production with Accuracy

Get more output with safety. That means, with greater accuracy. Foundrymen are thus helping their profit by using our pressure-cast matchplates and cope and drag plates. Single or multiple pattern matchplates cast under pressure in plaster molds—that's the proven answer to today's urgent production needs.

Get our quotations today.

PLASTER PROCESS CASTINGS COMPANY
Toledo Matchplate Co., Toledo 2, Ohio, Affiliated
6922 CARNEGIE AVENUE CLEVELAND 3, OHIO

Pressure-Cast MATCHPLATES
COPE and DRAG PLATES

DOUBLE YOUR PRODUCTION—with the fastest and most powerful Rammer made—

NO. 4 DAYTON RING VALVE BENCH RAMMER

Aside from its efficiency, the chief advantage of this Rammer lies in its long life. The Valve Unit will last for years without repair or replacement. The Cylinder Bore and Piston Rod are HARD CHROME PLATED, features which double the life of the Rammer and reduce maintenance costs at least one-half.

Have been adopted as standard by some of the largest users of Rammers throughout the Country. MADE IN FIVE SIZES Send for Bulletin No. 300.

DAYTON PNEUMATIC TOOL CO., DAYTON, O.

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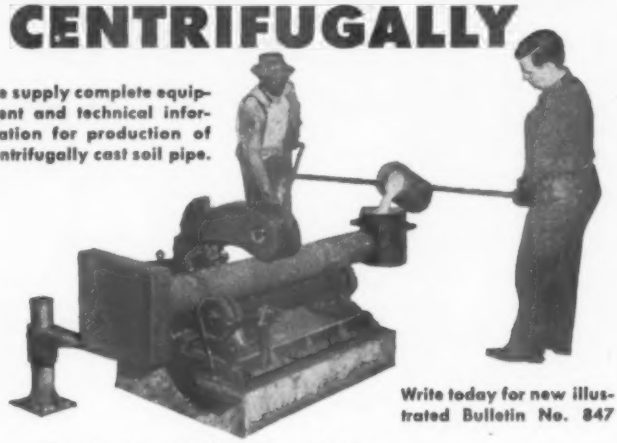
MANSFIELD, OHIO

CAST SOIL PIPE CENTRIFUGALLY

We supply complete equipment and technical information for production of centrifugally cast soil pipe.



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- Pipe Sizes from 2-inch Diameter Upwards

CENTRIFUGAL CASTING MACHINE CO.
P. O. Box 947 *Nathan Janco, Pres.* Tulsa 1, Okla.

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FOR LEADERSHIP IN THE SELF-POWERED LOADING AND CONVEYING FIELD! The Bosworth Line of Conveying and Loading Equipment is complete in every detail. If you believe in progressive, modern business then *look to Bosworth.*

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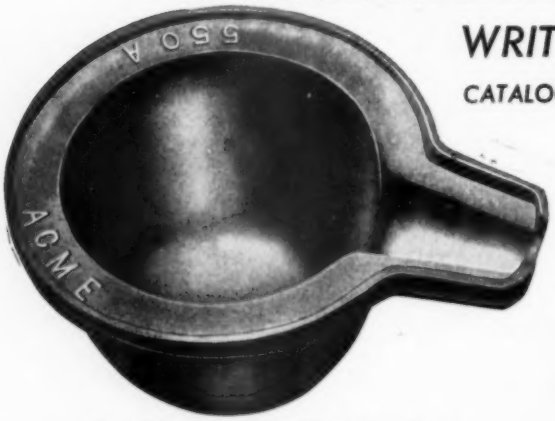
MELTING POTS—Ingot Molds

for ALUMINUM AND OTHER NONFERROUS METALS. 45 SIZES.



ROUND SPOUT POT NO. 550A
WITH 1½" COLLAR ON FLANGE

WRITE for
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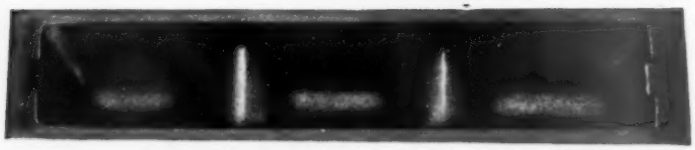
HOLDING——→
BOWL NO. HP7001



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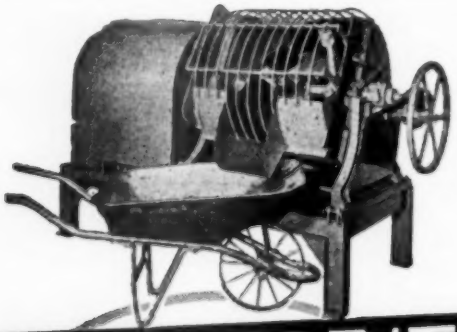

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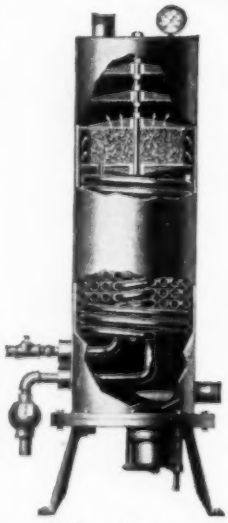

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50 to 2000 CFFAPM
Sizes
1" to 4"

COOL • CLEAN • DRY
TO POINT OF USE

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Guaranteed not alone to cool, clean and dry compressed air, but to deliver it so to point of use.

Built in 1", 1½", 2", 3", and 4" sizes, with capacities of 50 to 2,000 CFFAPM.

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Moisture Elimination Up To 3000 Pounds Per Square Inch

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GENUINE ALLOY STEEL SHOT

LASTS MANY TIMES LONGER

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Compared to regular blasting materials, AMASTEEL offers an amazing superiority due to its long life and resistance to breakdown and greater CLEANING and PEENING speed. This feature means additional savings on labor, handling, storage, freight costs, and dust disposal.

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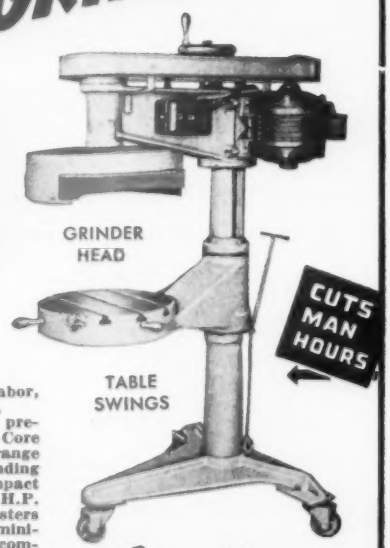
MURCO PORTABLE CORE GRINDER

FOR EITHER PRODUCTION OR JOBBING FOUNDRIES



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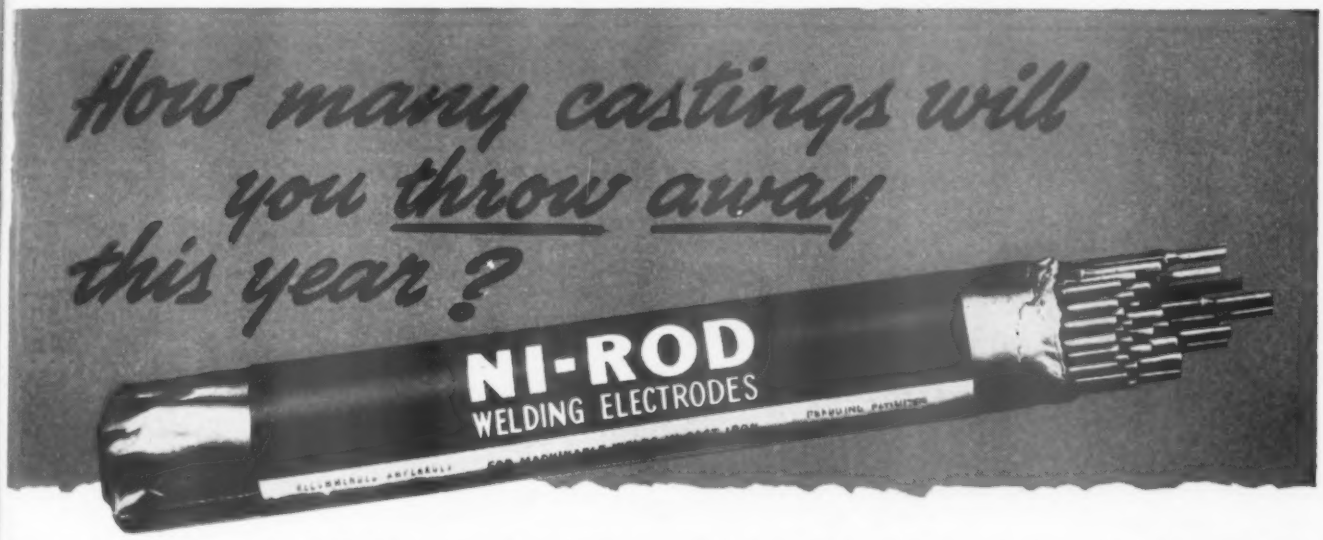

Few indeed—if there is NI-ROD* in your welding shop.

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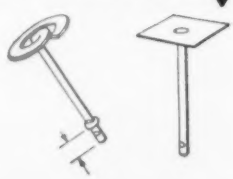

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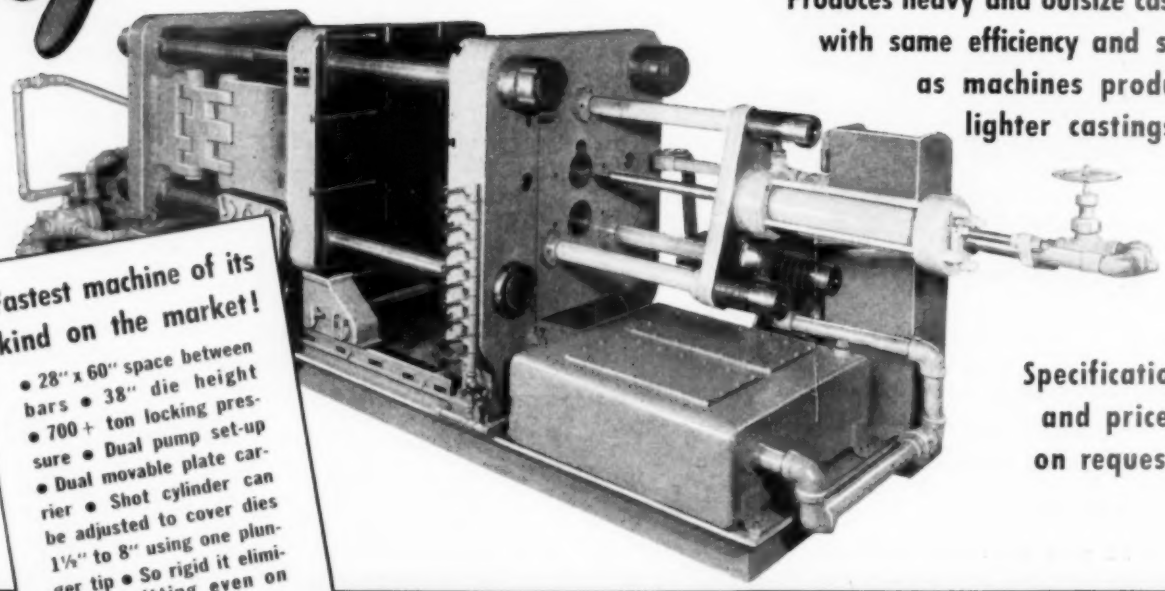
Produces heavy and outsize castings with same efficiency and speed as machines producing lighter castings . . .



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• **BALANCE** Perfect center balance of wheel and motor ensures grinding ease and efficiency.

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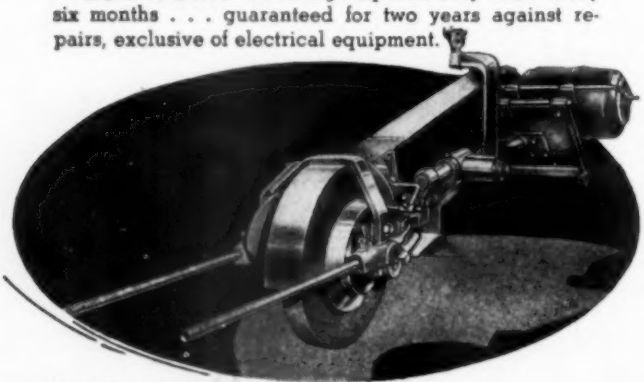

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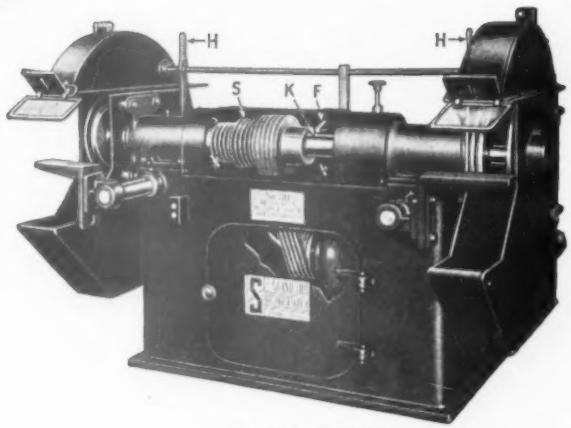

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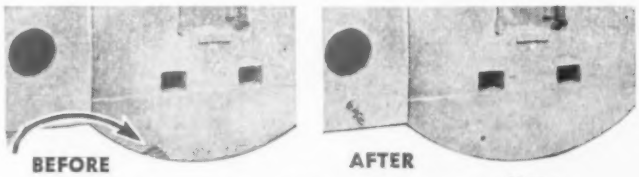

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You can't always prevent sand holes, blow holes, pock marks and other such surface blemishes that sometimes mar a sound casting's good looks. But you can—as most leading foundrymen do—make blemishes practically invisible with Smooth-On Foundry Cement. You can match your casting's color and texture and make an iron-hard repair that clings firmly in place, for Smooth-On expands slightly as it sets.

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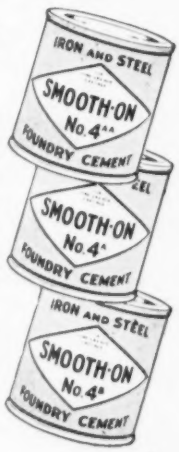

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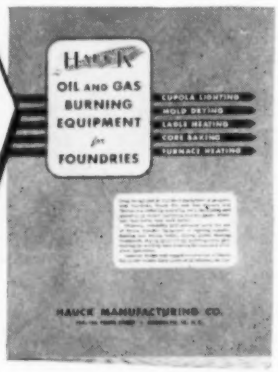

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QUIKDRAW CORE STRIPPERS
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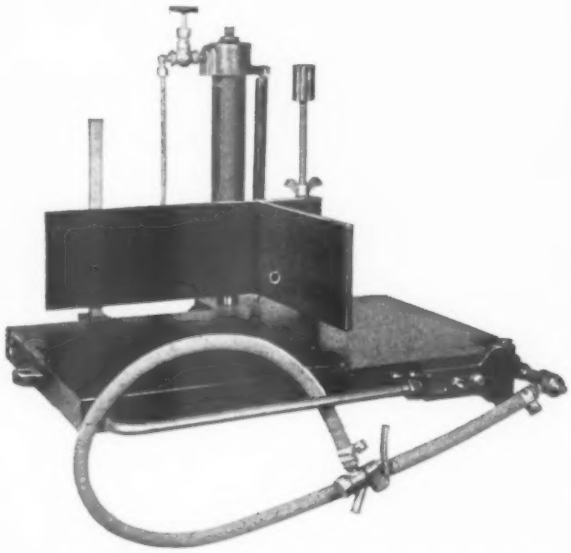

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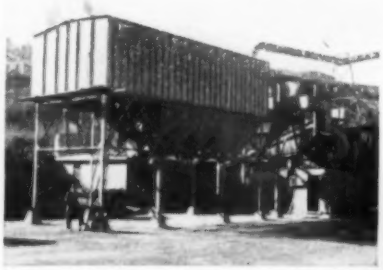

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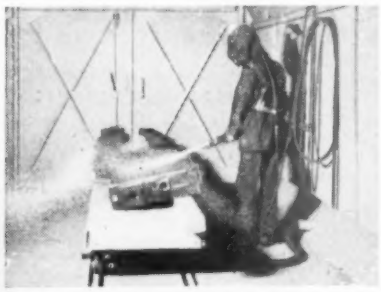

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LABORATORY ANALYSIS REPORT

FOR JOHN DOE FOUNDRY CO. NOV. 22, 1947

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SULPHUR	.090
PHOSPHORUS	.170
MANGANESE	.76
GRAPHITIC C.	2.54
TOTAL CARBON	3.30
CHROMIUM	.48
NICKEL	.22
MOLYBDENUM	.27
TENSILE	51,300
TRANSVERSE	3,450
DEFLECTION	.22
HARDNESS-BHN	248

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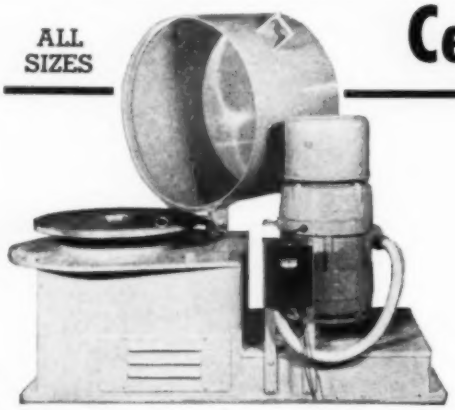

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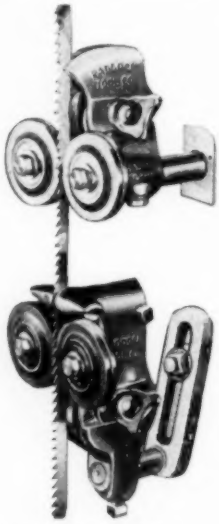

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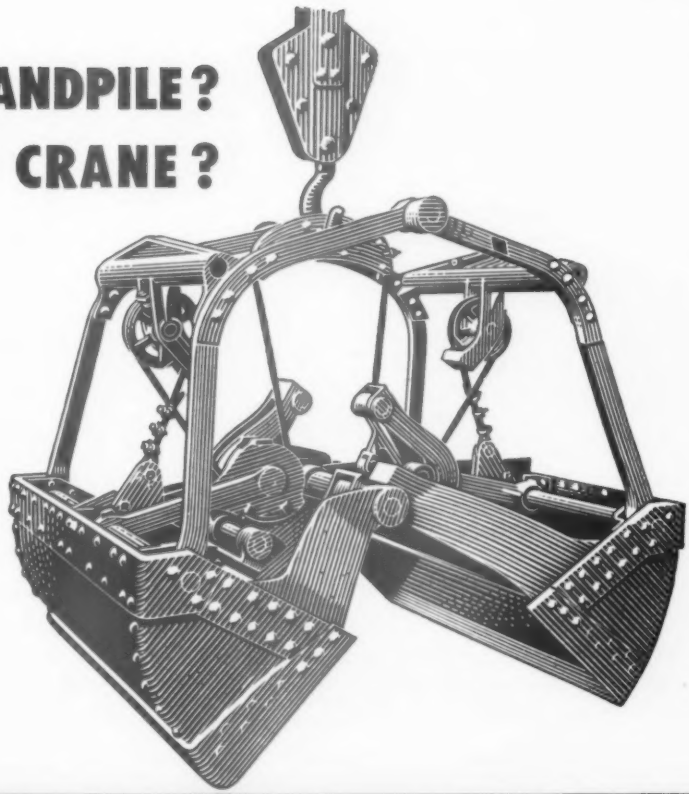

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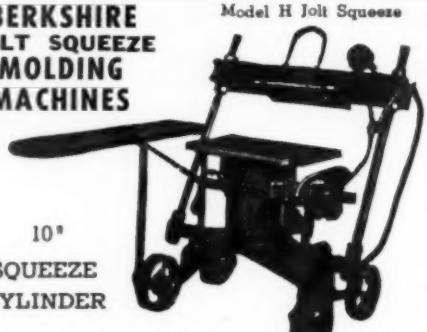

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Schmieg Industries, 6560 Cass Ave., Detroit 2, Mich.

DUST COLLECTORS (Shake-out)

Newcomb-Detroit Co., Inc., 5741 Russell St., Detroit 11, Mich.

DUST RECOVERY SYSTEMS

American Wheelabrator & Equipment Co., Mishawaka, Ind.
Kirk & Blum Mfg. Co., Cincinnati 25, O.
Parsons Engineering Corp., 2545 E. 79th St., Cleveland 4, O.
Whiting Corporation, 15607 Lathrop Ave., Harvey, Ill.

DYES & CHEMICALS

Eaton Chemical & Dyestuff Co., 1490 Franklin, Detroit, Mich.

ELECTRIC FURNACES (See Furnaces, Electric)

ELECTRODES (Graphite and Amorphous)

International Graphite & Electrode Corp., St. Marys, Pa.
National Carbon Co., Inc., Electrode Sales Div., 30 E. 42nd St., New York 17, N. Y.

ELEVATORS

Standard Conveyor Co., North St. Paul 9, Minn.

ELEVATORS (Bucket)

Bartlett & Snow Co., C. O., 6201 Harvard Ave., Cleveland 5, O.
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Jeffrey Mfg. Co., Columbus 16, O.
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Newaygo Engineering Co., Newaygo, Mich.

ELEVATORS (Material Handling)

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ELEVATORS (Pneumatic, Material Handling)

Fuller Co., Catasaqua, Pa.

ENGINEERING SERVICE (Foundry)

Carman, Edwin S., Lee Rd. at Mayfield, Cleveland 18, O.
Frank D. Campbell, 332 So. Michigan Ave. Chicago, Ill.
Engineering Service Inc., 610 West Michigan St., Milwaukee 3, Wis.
Giffels & Vallet, Inc., Marquette Bldg., Detroit, Mich.
Chas. C. Kawin Co., 431 S. Dearborn St., Chicago 5, Ill.
Lester B. Knight & Associates, Inc., 600 West Jackson Blvd., Chicago 3, Ill.
A. H. Putnam Co., 1319 2nd Ave., Rock Island, Ill.
Reichert, W. G., Engineering Co., 1060 Broad St., Newark, N. J.
Swan, Harry B., 2983 East Grand Blvd., Detroit, Mich.
Westover Engineers, 424 E. Wells St., Milwaukee 2, Wis.
Wickland Co., A. A., 205 W. Wacker Dr., Chicago 6, Ill.

ENGINEERING SERVICE (Permanent Mold)

Industrial Pattern Works, 2621 Belmont Ave., Chicago 18, Ill.
Master Pattern Co., 1315 Main Ave., Cleveland, Ohio.

EXHAUST SYSTEMS

American Air Filter Co., Inc., Louisville 8, Ky.

EXHAUST SYSTEMS (Cont'd.)

American Wheelabrator & Equipment Co., Mishawaka, Ind.
Newcomb-Detroit Co., Inc., 5741 Russell St., Detroit 11, Mich.
Pangborn Corporation, Hagerstown, Md.
Parsons Engineering Corp., 2545 E. 79th St., Cleveland 4, O.
Propellair Inc., Springfield, O.
Schmeig Industries, 6560 Cass Ave., Detroit 2, Mich.
Schneible Co., Claude B., 2827—25th St., Detroit 16, Mich.
Sly Mfg. Co., W. W., 4753 Train Ave., Cleveland 2, O.
Westinghouse Electric Corp., B. F. Sturtevant Div., 40 Wall St., New York 4, N. Y.
Whiting Corporation, 15607 Lathrop Ave., Harvey, Ill.

FABRICATORS (Metal)

Roura Iron Works, 1405 Woodland Ave., Detroit 11, Mich.

FACINGS

Delta Oil Products Co., Milwaukee 9, Wis.
Federal Foundry Supply Co., 4600 E. 71st St., Cleveland 5, O.
National Carbon Co., Inc., Carbon Products Div., 30 E. 42nd St., New York 17, N. Y.
Stevens Inc., Frederic B., Detroit 16, Mich.
Superior Flake Graphite Co., 33 S. Clark St., Chicago 3, Ill.
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FANS

General Blower Co., Morton Grove, Ill.

FANS (Ventilating, Exhaust, Cooling, etc.)

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Joy Mfg. Co., La Del Division, New Philadelphia, Ohio.
Pangborn Corp., Hagerstown, Md.
Propellair Inc., Springfield, O.
Westinghouse Electric Corp., B. F. Sturtevant Div., 40 Wall St., New York 4, N. Y.

FEEDERS (Rotary)

Fuller Company, Catasauqua, Pa.
Link Belt Co., 300 W. Pershing Rd., Chicago 9, Ill.
Newaygo Engineering Co., Newaygo, Mich.

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Bartlett & Snow Co., C. O., 6201 Harvard Ave., Cleveland 5, O.
Jeffrey Mfg. Co., 907 N. Fourth St., Columbus 16, O.
Link Belt Co., 300 W. Pershing Rd., Chicago 9, Ill.

FERROBORON

Electro Metallurgical Sales Corp., 30 E. 42nd St., New York 17, N. Y.
Molybdenum Corp. of America, Pittsburgh 19, Pa.

FERROCHROME

Electro Metallurgical Sales Corp., 30 E. 42nd St., New York 17, N. Y.
Hickman-Williams & Co., Cleveland, O.
Ohio Ferro-Alloys Corp., Canton 2, O.
Vanadium Corp. of America, 420 Lexington Ave., New York, N. Y.

FERROCOLUMBIUM

Electro Metallurgical Sales Corp., 30 E. 42nd St., New York 17, N. Y.

FERROMANGANESE

Bethlehem Steel Co., Bethlehem, Pa.
Electro Metallurgical Sales Corp., 30 E. 42nd St., New York 17, N.Y.
Ohio Ferro-Alloys Corp., Canton 2, O.

FERROMOLYBDENUM

Climax Molybdenum Co., 500 Fifth Ave., New York 18, N. Y.
Molybdenum Corporation of America, Pittsburgh 19, Pa.

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Electro Metallurgical Sales Corp., 30 E. 42nd St., New York 17, N. Y.
Globe Iron Co., Jackson, Ohio.
Jackson Iron & Steel Co., Jackson, O.
Keokuk Electro Metals Co., 429 So. 4th St., Keokuk, Iowa.
Miller & Company, 332 S. Michigan Ave., Chicago 4, Ill.
Ohio Ferro-Alloys Corp., Canton 2, O.
Vanadium Corp. of America, 420 Lexington Ave., New York, N. Y.

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Electro Metallurgical Sales Corp., 30 E. 42nd St., New York 17, N. Y.
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Electro Metallurgical Sales Corp., 30 E. 42nd St., New York 17, N. Y.
Molybdenum Corp. of America, Pittsburgh 19, Pa.

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General Electric X-Ray Corp., 4855 West McGeogh Ave., Milwaukee 14, Wis.

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Dollinger Corp., 36 Centre Park, Rochester 4, N. Y.

FILTERS (All Types)

Dollinger Corp., 36 Centre Park, Rochester 4, N. Y.

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Ironton Fire Brick Co., Ironton, O.
Norton Co., Worcester 6, Mass.
Robinson Clay Products Co., 1100 Second National Bldg., Akron, Ohio.
Stevens Inc., Frederic B., Detroit 16, Mich.

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Eastern Clay Products, Inc., Jackson, O.
Illinois Clay Products Co., Joliet, Ill.
Ironton Fire Brick Co., Ironton, O.
Robinson Clay Products Co., 1100 Second National Bldg., Akron, Ohio.

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Carborundum Co., Niagara Falls, N. Y.
Cleveland Quarries Co., 1740 E. 12th St., Cleveland 14, O.

FIRESTONE

Cleveland Quarries Co., 1740 E. 12th St., Cleveland 14, O.

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Universal Engineering Co., Frankenmuth, Mich.

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Fremont Flask Co., Fremont, O.
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Fremont Flask Co., Fremont, O.
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Truscon Steel Co., Pressed Steel Div., 6100 Truscon Ave., Cleveland, Ohio.

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Buckeye Products Co., 7022 Vine St., Cincinnati 16, Ohio.
Diamond Clamp & Flask Co., Richmond, Ind.
Federal Foundry Supply Co., 4600 E. 71st St., Cleveland 5, O.
Hines Flask Co., 3431 W. 140th St., Cleveland 11, Ohio.
Truscon Steel Co., Pressed Steel Div., 6100 Truscon Ave., Cleveland, Ohio.

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Carbon Limestone Co., Youngstown, Ohio.
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FOUNDRY SHOVELS

(See SHOVELS)

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Federal Foundry Supply Co., 4600 E. 71st St., Cleveland 5, O.
Freeman Supply Co., 1152 E. Broadway, Toledo 5, O.
Pennsylvania Foundry Supply & Sand Co., Ashland & E. Lewis Sts., Philadelphia 24, Pa.
Stevens, Inc., Frederic B., Detroit 16, Mich.

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Foundry Equipment Co., 1831 Columbus Rd., Cleveland 13, Ohio.

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Despatch Oven Co., Minneapolis 14, Minn.
Foundry Equipment Co., 1831 Columbus Rd., Cleveland 13, Ohio.

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Campbell-Hausfeld Co., Harrison, O.
Wilson Industries, 38 Memorial Dr., Cambridge 42, Mass.

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Ajax Electric Co., Inc., Philadelphia 23, Pa.
Despatch Oven Co., Minneapolis 14, Minn.

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Carl-Mayer Corp., 3030 Euclid Ave., Cleveland 15, Ohio.
Despatch Oven Co., Minneapolis 14, Minn.
Foundry Equipment Co., 1831 Columbus Rd., Cleveland 13, Ohio.
Johnston Mfg. Co., Minneapolis 13, Minn.
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Westinghouse Electric Corp., Pittsburgh 30, Pa.
Whiting Corporation, 15607 Lathrop Ave., Harvey, Ill.

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Ajax Electrothermic Corp., Trenton, N. J.
Ajax Metal Co., Philadelphia 23, Pa.
Campbell-Hausfeld Co., 300-320 Moore St., Harrison, O.
Fisher Furnace Co., 2453 West Hubbard St., Chicago 12, Ill.
Johnston Mfg. Co., Minneapolis 13, Minn.
Randall Corp., Newberg Station, Cleveland 5, Ohio.
Stroman Furnace & Engineering Co., 300 W. Adams St., Chicago 6, Ill.

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Ajax Electric Furnace Corp., 46 Richmond St., Philadelphia 23, Pa.
Ajax Electrothermic Corp., Trenton, N. J.
Ajax Engineering Corp., Trenton, N. J.
Ajax Metal Co., Philadelphia 23, Pa.
American Bridge Co., Pittsburgh 19, Pa.
Detroit Electric Furnace Div. of Kuhlman Electric Co., Bay City, Mich.
Greene Electric Furnace Co., 2702 6th So., Seattle 4, Wash.
Pittsburgh Lectromelt Furnace Corp., P. O. Box 1125, Pittsburgh, Pa.
Swindell-Dressler Corp., Pittsburgh, Pa.
Whiting Corporation, 15607 Lathrop Ave., Harvey, Ill.

FURNACES (Gas or Oil Fired)

Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.
Campbell-Hausfeld Co., Harrison, O.
Carl-Mayer Corp., 3030 Euclid Ave., Cleveland 15, Ohio.
Denver Fire Clay Co., 2301 Blake St., Denver, Colo.
Foundry Equipment Co., 1831 Columbus Rd., Cleveland 13, Ohio.
Haynes Foundry Equipment Co., 814 Ada St., Kalamazoo 21, Mich.
Johnston Mfg. Co., Minneapolis 13, Minn.
Lindberg Engineering Co., 2450 West Hubbard, Chicago 12, Ill.

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Randall Corp., Newberg Station, Cleveland 5, Ohio.
Stroman Furnace & Engineering Co., 300 W. Adams St., Chicago 6, Ill.
Wilson Industries, 38 Memorial Dr., Cambridge 42, Mass.
Lanly Company, 750 Prospect Ave., Cleveland 15, Ohio.
Lindberg Engineering Co., 2450 West Hubbard, Chicago 12, Ill.

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American Bridge Co., Pittsburgh 19, Pa.
Detroit Electric Furnace Div. of Kuhlman Electric Co., Bay City, Mich.
Pittsburgh Lectromelt Furnace Corp., P.O. Box 1125, Pittsburgh, Pa.
Swindell-Dressler Corp., Pittsburgh, Pa.
Whiting Corporation, 15607 Lathrop Ave., Harvey, Ill.
Wilson Industries, 38 Memorial Dr., Cambridge 42, Mass.

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Carl-Mayer Corp., 3030 Euclid Ave., Cleveland 15, Ohio.
Despatch Oven Co., Minneapolis 14, Minn.
Foundry Equipment Co., 1831 Columbus Rd., Cleveland 13, Ohio.
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Foundry Equipment Co., 1831 Columbus Rd., Cleveland 13, Ohio.
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Ajax Electrothermic Corp., Trenton, N. J.
Ajax Engineering Corp., Trenton, N. J.
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Campbell-Hausfeld Co., Harrison, O.
Detroit Electric Furnace Div. of Kuhlman Electric Co., Bay City, Mich.
Federal Foundry Supply Co., 4600 E. 71st St., Cleveland 5, O.
Fisher Furnace Co., 2453 West Hubbard St., Chicago 12, Ill.
Haynes Foundry Equipment Co., 814 Ada St., Kalamazoo 21, Mich.
Johnston Mfg. Co., Minneapolis 13, Minn.
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Swindell-Dressler Corp., Pittsburgh, Pa.
Whiting Corp., 15607 Lathrop Ave., Harvey, Ill.

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Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.
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Metal Blast, Inc., 871 E. 67th St., Cleveland, Ohio.
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Cleco Pneumatic Tool Div., Reed Roller Bit Co., Houston, Texas.
Dayton Pneumatic Tool Co., Dayton 1, Ohio.
Independent Pneumatic Tool Co., 600 West Jackson Blvd., Chicago 6, Ill.
Joy Mfg. Co., Sullivan Division, Michigan City, Ind.
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Newcomb-Detroit Co., Inc., 5741 Russell St., Detroit 11, Mich.

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American Wheelabrator & Equipment Co., Mishawaka, Ind.
Westinghouse Electric Corp., B. F. Sturtevant Div., 40 Wall St., New York 4, N. Y.

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American Optical Co., Southbridge, Mass.
Mine Safety Appliance Co., Braddock, Thomas & Meade Sts., Pittsburgh 8, Pa.
Pangborn Corp., Hagerstown, Md.
W. W. Sly Mfg. Co., 4753 Train Ave., Cleveland 2, O.

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Curtis Pneumatic Machinery Co., 1922 Kienlen Ave., St. Louis 20, Mo.

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C. M. Smillie & Co., 1100 Woodward Hgts. Blvd., Ferndale, Mich.
Landis Mfg. Co., 2305 Hilton Rd., Ferndale, Mich.

VIBRATION REDUCTION PADS

Fabreeka Products, Inc., 222B Summer St., Boston, Mass.

VIBRATORS

Adams Co., Dubuque, Iowa.
Beardsley & Piper Co., 2424 No. Cicero, Chicago 39, Ill.
Cannon Vibrator Co., 111 Power Ave., Cleveland 14, Ohio.
Cleveland Vibrator Co., 2828 Clinton Ave., W., Cleveland 13, Ohio.
Davenport Machine & Foundry Co., Davenport, Iowa.
Federal Foundry Supply Co., 4600 E. 71st St., Cleveland 5, O.
Foundry Supplies & Mfg. Co., 2221 Orchard St., Chicago 14, Ill.
Freeman Supply Co., 1152 Broadway, Toledo 5, O.
Herman Pneumatic Machine Co., Union Bank Bldg., Pittsburgh 22, Pa.
Link Belt Co., 300 W. Pershing Rd., Chicago, Ill.
Milwaukee Foundry Equipment Co., 3238 W. Pierce St., Milwaukee, Wis.
New Haven Vibrator Co., 131 Chestnut St., New Haven 7, Conn.
Nichols Co., Wm. H., Richmond Hill, Long Island 18, N. Y.
Osborn Mfg. Co., 5401 Hamilton Ave., Cleveland 14, O.
S P O Incorporated, 7500 Grand Division Ave., Cleveland 5, O.
Syntron Company, Homer City, Pa.
Tabor Mfg. Co., 6225 Tacony St., Philadelphia 35, Pa.

VIBRATORS (Core Bench)

Cleveland Vibrator Co., 2828 Clinton Ave., W., Cleveland 13, Ohio.

WASH ROOM EQUIPMENT

Bradley Washfountain Co., Box 732, Milwaukee 1, Wis.

WATER COOLERS (Electric)

Ebco Mfg. Co., 401 W. Town St., Columbus 8, Ohio.

WAX (Core, Vent, Pattern)

P.M.S. Co., 1701 Power Ave., Cleveland 14, Ohio.
United Compound Co., Inc., 328 South Park Ave., Buffalo 4, N. Y.

WEDGES (Foundry)

Chicago Mfg. & Distributing Co., 1928 W. 46th St., Chicago 9, Ill.
Sterling Wheelbarrow Co., 7100 W. Walker St., Milwaukee 14, Wis.

WELDING GAS

Air Reduction Sales Co., 60 East 42nd St., New York 17, N. Y.
Linde Air Products Co., 30 E. 42nd St., New York 17, N. Y.

WELDING APPARATUS (Electric Arc)

Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.
Air Reduction Sales Co., 60 East 42nd St., New York 17, N. Y.
Linde Air Products Co., 30 E. 42nd St., New York 17, N. Y.
Westinghouse Electric Corp., Pittsburgh 30, Pa.

WELDING and CUTTING APPARATUS and SUPPLIES

Air Reduction Sales Co., 60 East 42nd St., New York 17, N. Y.
Linde Air Products Co., 30 E. 42nd St., New York 17, N. Y.

WELDING ELECTRODES (Carbon)

National Carbon Co., Carbon Products Div., 30 E. 42nd St., New York 17, N. Y.

WELDING RODS & ELECTRODES

Air Reduction Sales Co., 60 East 42nd St., New York 17, N. Y.
International Nickel Co., Inc., 67 Wall St., New York 5, N. Y.
Linde Air Products Co., 30 E. 42nd St., New York 17, N. Y.

WHEELBARROWS

Sterling Wheelbarrow Co., 7100 W. Walker St., Milwaukee 14, Wis.

WHEELS, ABRASIVE (Cut-off)

Bay State Abrasive Products Co., Westboro, Mass.
Carborundum Co., Perth Amboy, N. J.
Electro Refractories & Alloys Corp., Vars Bldg., Buffalo 2, N. Y.
Independent Pneumatic Tool Co., 600 West Jackson Blvd., Chicago 6, Ill.
Raybestos Manhattan, Inc., Manhattan Rubber Division, Passaic, N. J.
Norton Company, Worcester 6, Mass.
Peninsular Grinding Wheel Co., 729 Meldrum Ave., Detroit, Mich.
Simonds Abrasive Co., Tacony & Fraley Sts., Philadelphia 37, Pa.
Sterling Grinding Wheel Division, Cleveland Quarries Co., Tiffin, Ohio.

WHEELS (Wire)

Osborn Mfg. Co., 5401 Hamilton Ave., Cleveland 14, O.

WIRE BENDERS

Redford Iron & Equipment Co., 21315 W. McNichols Rd., Detroit, Mich.

WIRE BRUSHES

Independent Pneumatic Tool Co., 600 West Jackson Blvd., Chicago 6, Ill.
Osborn Mfg. Co., 5401 Hamilton Ave., Cleveland 14, O.

WIRE CUTTERS

Redford Iron & Equipment Co., 21315 W. McNichols Rd., Detroit, Mich.

WOODWORKING MACHINERY

Do All Company, Des Plaines, Ill.
Freeman Supply Co., 1152 Broadway, Toledo 5, O.
Oliver Machinery Co., Grand Rapids 2, Mich.
Parks Woodworking Machine Co., 1546 Knowlton St., Cincinnati 23, Ohio.

X-RAY EQUIPMENT

Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.
General Electric X-Ray Corp., 4855 West McGeogh Ave., Milwaukee 14, Wis.
Westinghouse Electric Corp., Pittsburgh 30, Pa.

X-RAY FILMS

Eastman Kodak Co., Rochester, N. Y.
General Electric X-Ray Corp., 4855 West McGeogh Ave., Milwaukee 14, Wis.

ZINC

American Smelting & Refining Co., 120 Broadway, New York 5, N.Y.

Classified Advertising

Help Wanted

GENERAL FOUNDRY FOREMAN

Want an experienced, aggressive man for a mechanized malleable foundry. Must be able to get maximum production, keep scrap at low level and be able to handle men. State age and experience, stressing supervisory experience in molding. Good opportunity. Address: Box 836, The FOUNDRY, Cleveland 13, Ohio.

SALES REPRESENTATIVE

For Texas, Tennessee and Pennsylvania well introduced in foundry and die casting trade for a mid-western chemical manufacturing company. Address: Box 820, The FOUNDRY, Cleveland 13, Ohio.

TOOL AND METHODS ENGINEER

Midwest manufacturer in small community wants a tool and methods engineer with experience and knowledge of nonferrous bronze and aluminum foundry work—also molding, patterns, die casting and cleaning of castings. Excellent opportunity. Address: Box 888, The FOUNDRY, Cleveland 13, Ohio.

FOUNDRY FOREMAN

For progressive gray iron, brass and aluminum foundry located in the South with unlimited possibilities for expansion. Must be capable of handling both job and production work. Must be able to organize and handle men, understand cupola thoroughly, knowledge of metallurgy in order to produce castings to required analysis and core room knowledge. Good climate and splendid opportunity. State age, salary and experience. Address: Box 852, The FOUNDRY, Cleveland 13, Ohio.

MASTER MECHANIC AND MAINTENANCE HEAD

Steel Foundry. Master mechanic between 35-45 years of age. Must have full knowledge of electrical work, millwright work, pipe fitting work and machining work. Must have supervisory experience. Write giving experience, stressing supervisory experience and salary expected. Address: Box 927, The FOUNDRY, Cleveland 13, Ohio.

FOUNDRY FOREMAN

Permanent mold working foundry foreman having broad experience with aluminum alloys. To qualify applicant must have intimate knowledge of gating and venting technique, mold coatings and pouring practice. The man sought must be trained in volume production of pressure-tight aluminum castings in a wide size range. Do not apply unless you can qualify. Address: Box 907, The FOUNDRY, Cleveland 13, Ohio.

FOUNDRY FOREMAN

Well financed established bronze and brass foundry, located in Western Connecticut desires man able to manage foundry operations. Must be capable of supervising complete production and able to handle men. Knowledge of squeeze machines and metals necessary. Address: Box 894, The FOUNDRY, Cleveland 13, Ohio.

SUPERINTENDENT OR ASSISTANT

For a large bronze foundry handling a wide range of alloys. Must be experienced in heavy dry sand molding. Apply giving history and references. Address: Box 922, The FOUNDRY, Cleveland 13, Ohio.

CORE ROOM FOREMAN

Steel foundry. Core room foreman between 35-45 years of age with full knowledge of floor core making and bench core making. Must have supervisory experience. Write giving experience, stressing supervisory experience in core making, types of cores you have worked on and salary expected. Address: Box 925, The FOUNDRY, Cleveland 13, Ohio.

MOLDING FOREMAN

Steel foundry. Molding foreman between 35-45 years of age with full knowledge of all phases of floor molding. Must know sand mixes. Must have supervisory experience. Write giving experience stressing supervisory experience in floor molding and salary expected. Address: Box 926, The FOUNDRY, Cleveland 13, Ohio.

METAL PATTERNS MAKERS

Experienced on bench and machines. Address: Box 889, The FOUNDRY, Cleveland 13, Ohio.

Help Wanted

HELP WANTED

"A completely new and modern gray iron foundry of the automotive type located in the middle west is interested in filling the positions listed below. Applicants are requested to submit information outlining qualifications, both education and experience, in detail."

"**Assistant Foundry Superintendent** capable of establishing and maintaining a production control system, familiar with all phases of foundry practices and possessing an aptitude for handling labor relation problems."

"**Foundry Foreman** with experience in and thorough knowledge of all mechanical molding procedures, (Jolt Roll Over, Traveling Slinger, Squeeze Molding, etc.)."

"**Foundry Metallurgist** with a thorough knowledge of cupola practices and capable of directing cupola operations."

"**Foundry Engineer** with complete knowledge of Foundry layout and mechanical foundry equipment in general."

BOX 834

The FOUNDRY **CLEVELAND 13, OHIO**

FOUNDRY FOREMAN

To take charge of molding in a well established grey iron foundry located in Southern Ohio, producing high quality castings. Must be experienced in jolt rollover and squeezer machine work, understand gating and risering; side floor green sand and medium heavy dry sand. This is a good connection for a reliable man that can qualify.

BOX 881

THE FOUNDRY **CLEVELAND 13, OHIO**

METALLURGISTS

Wanted to take complete charge of melting department, cupola repairs and iron pouring in grey iron foundry, automotive castings, pouring 60-70 tons per day located in Western Michigan.

BOX 897

THE FOUNDRY **CLEVELAND 13, OHIO**

FOREMEN

Malleable foundry wants two foremen, one experienced on tight flask drop machine work and one experienced on squeezer work. Applicants to have ability in gating, feeding and reducing foundry scrap. State your qualifications, experience and salary expected.

BOX 895

THE FOUNDRY **CLEVELAND 13, OHIO**

SUPERINTENDENT OR EXECUTIVE

Man to take over and operate on a profit sharing basis well equipped grey iron foundry. Small investment required for materials and operating capital. Will have complete charge and management. Address: Box 860, The FOUNDRY, Cleveland 13, Ohio.

BRASS FOUNDRY FOREMAN

For modern production shop. Must be thoroughly acquainted with the mixing of metals and with squeezer match plate work. State experience and references in first letter. Address: Box 896, The FOUNDRY, Cleveland 13, Ohio.

Help Wanted

WORKS MANAGER
OR
GENERAL SUPERINTENDENT

To take charge of operations in steel foundry including acid open hearth, foundry, core room and cleaning room. Should have ability to coordinate operations and control costs. Experience in heavy steel castings desirable but should also have knowledge of machine molding production methods. Adequate salary and share in cost savings to right man. Address: Box 902, The FOUNDRY, Cleveland 13, Ohio.

CLEANING ROOM FOREMAN

With side frame and bolster experience. Excellent opportunity with large foundry in Western Pennsylvania. Address: Box 921, The FOUNDRY, Cleveland 13, Ohio.

GRAY IRON FOUNDRY SUPERINTENDENT

Experienced man capable of taking complete charge of all departments of a long established medium jobbing and semi-production foundry. Must have excellent habits, be qualified to estimate blueprints, set piecework and incentive prices, thoroughly competent in cupola practice, alloying, sand control, rigging for production and able to handle men. Excellent opportunity for the right man. If you are qualified for a position of this kind, write giving references, age, experience and salary expected. Address: Box 918, The FOUNDRY, Cleveland 13, Ohio.

COMPETENT CUPOLA OPERATOR

Exceptional opportunity for one capable of making shot. Submit experience, references and salary desired. Permanent situation. Advise phone number. Address: Box 886, The FOUNDRY, Cleveland 13, Ohio.

Positions Wanted

GENERAL COREROOM FOREMAN
OR
SUPERINTENDENT

Twenty-five years' experience in coreroom. Can set up and operate efficiently production core room department. Experience in steel and grey iron on all type cores with latest type of equipment and foundry technique. Presently employed as general foreman in large grey iron foundry. Address: Box 923, The FOUNDRY, Cleveland 13, Ohio.

FOUNDRYMAN

Thirty years' experience in nonferrous foundries as molder, foreman, superintendent, general manager and part owner wishes to take complete charge of small medium size brass and aluminum foundry on small salary and profit sharing basis or will take straight salary. Can handle everything from furnace room to costs. Good at handling men. Prefer shop in small or medium size town any place. Address: Box 916, The FOUNDRY, Cleveland 13, Ohio.

FOUNDRY EXECUTIVE

DESIRES CONNECTION WITH PROGRESSIVE FOUNDRY. AGE 42, MARRIED. 22 YEARS PRACTICAL EXPERIENCE IN CASTING STEEL, HIGH ALLOYS AND IRON. SEVEN YEARS IN RESPONSIBLE POSITIONS WITH EXCELLENT RECORD. AT PRESENT TIME SUPERINTENDENT IN MID-WESTERN COMPANY. ADDRESS: BOX 814, THE FOUNDRY, CLEVELAND 13, OHIO.

ALUMINUM PERMANENT MOLD FOUNDRY ENGINEER

TWENTY-FIVE YEARS' EXPERIENCE. COOKING UTENSIL SPECIALIST OR ANYTHING YOU WANT MADE. FULL OR PART TIME. ADDRESS: BOX 667, THE FOUNDRY, CLEVELAND 13, OHIO.

FOUNDRY SUPERINTENDENT

Practical molder and core maker with 26 years' experience as foundry superintendent. All classes of jobbing, rollover and squeezer. Mix by analysis. At present employed. Address: Box 869, The FOUNDRY, Cleveland 13, Ohio.

MASTER MECHANIC

Master mechanic and maintenance head of foundry and machine shop. 14 years' experience. Reliable references gladly furnished. Address: Box 899, The FOUNDRY, Cleveland 13, Ohio.

Classified Advertising

Positions Wanted

GRAY IRON FOUNDRY OPERATOR

Experienced manager with a qualified record in production and sales of diversified quality castings, either continuous or conventional operation. Prefer foundry that can make full use of a seasoned and mature background. Address: Box 773, The FOUNDRY, Cleveland 13, Ohio.

FOREMAN

Desires position as foreman or superintendent. Practical man. Twenty-two years' experience from molder to foreman gray iron or nonferrous, soil pipe and fittings. Prefer Western or Central New York. Address: Box 868, The FOUNDRY, Cleveland 13, Ohio.

FOUNDRYMAN

High type with practical and technical background wishes to make change. Twenty-five years as operating manager of light and medium gray iron foundries. Three years as free lance consultant. Can handle all phases of operations including design, equipment layout, production, costs, sales with special emphasis on cupola operations. Address: Box 917, The FOUNDRY, Cleveland 13, Ohio.

GENERAL MANAGER

Mature, profit-minded, dependable. Has successfully managed four companies—two taken out of the red. Available for service shortly with medium-size company requiring reliable directing ability in management, sales finance and production. Excellent experience, foundry, machine and related lines. Address: Box 871, The FOUNDRY, Cleveland 13, Ohio.

DIRECTOR LABOR RELATIONS AND PERSONNEL

47 with 25 years' experience policy formation and administration, all phases negotiate agreements C.I.O. and A. F. of L. Unions. Proven record of successful labor management. Now consultant but desires change. Complete resume on request. Address: Box 890, The FOUNDRY, Cleveland 13, Ohio.

SUPERINTENDENT

Wants position as foundry superintendent. Practical man. Nine years molding, coremaking and melting with ten years as foundry superintendent in light to heavy jobbing and production work. Can furnish reliable estimates on foundries. Address: Box 825, The FOUNDRY, Cleveland 13, Ohio.

STEEL MILL ELECTRIC FURNACE MELTER

Now employed, desires change. 39 years old, some open hearth experience, 15 years electric furnace experience, last ten years as melter. Address: Box 841, The FOUNDRY, Cleveland 13, Ohio.

COREROOM FOREMAN

Twenty-five years' experience as foreman, both iron and steel, wide experience in core blowing machines. Also rigging and making small castings on dry sand. Employed at present but desire change. Address: Box 901, The FOUNDRY, Cleveland 13, Ohio.

CORE OIL SALESMAN

Position wanted by practical man to demonstrate and sell core oils. Can also make core oils. Address: Box 898, The FOUNDRY, Cleveland 13, Ohio.

FOUNDRY SUPERINTENDENT

Young, industrious foundryman desires position in nonferrous foundry. Experienced as general foreman and superintendent in jobbing and production. Qualified to teach bench and floor molding also core making in bronze and its alloys. Address: Box 900, The FOUNDRY, Cleveland 13, Ohio.

PATTERNSHOP FOREMAN

Thorough experience from small to large patterns—wood, metal or plaster. Capable of soleiting and making layout and performing work myself in small shop. Can supervise men and teach apprentice in larger shop. Apprentice can be taught in two years to do most of work. Make matchplates, core blowing boxes and driers also rig work for foundry including blowing of medium size cores in present wood core boxes. Address: Box 913, The FOUNDRY, Cleveland 13, Ohio.

Positions Wanted

MAINTENANCE SUPERINTENDENT AND FOUNDRY ENGINEER

Very wide experience practical and technical in supervision of maintenance and layout of all types machinery and modern sand equipment, excellent record in industrial relations, complete knowledge of foundry operation. Desire change. Address: Box 872, The FOUNDRY, Cleveland 13, Ohio.

PRACTICAL FOUNDRYMAN

With 15 years' sales experience to foundry trade would like one or two lines on commission in Chicago area where well acquainted. Address: Box 870, The FOUNDRY, Cleveland 13, Ohio.

SALESMAN

Foundry executive now employed and having 26 year's experience in all phases of the grey iron foundry business. Will consider a sales position with a successful foundry supply company. Prefer Central New York state territory. Address: Box 877, The FOUNDRY, Cleveland 13, Ohio.

REGISTERED PATENT AGENT

Chemist, two scientific degrees, extensive patent experience in chemical, metallurgical and mechanical arts, available for part-time work. Address: Box 856, The FOUNDRY, Cleveland 13, Ohio.

FOUNDRYMAN

Over 17 years in foundry work. Now employed but desire new connection. Experienced in steel and alloyed cast iron. Served as supervisor. Control of foundry and core sands. Familiar with general melting practice, foundry equipment, methods and cost. Address: Box 848, The FOUNDRY, Cleveland 13, Ohio.

FOUNDRY EXECUTIVE

Mechanical engineer with 20 years of supervision in grey iron and nonferrous foundries desires responsible position in modern plant. Familiar with all modern core room and foundry machines and methods. Some experience in tool and production machining. Successful in handling help and training new men. Address: Box 911, The FOUNDRY, Cleveland 13, Ohio.

SALESMAN

Desires connection with progressive foundry. Now employed with 30 years industrial background. Will consider a sales position with a successful foundry supply company. Prefer Western states territory. Address: Box 928, The FOUNDRY, Cleveland 13, Ohio.

MASTER MECHANIC

Ten years' experience in maintenance, supervising and inspecting installation of new equipment in highly mechanized foundry. Qualified machinist, millwright, welder, layout man, trouble shooter on equipment and mechanical and electrical controls. Married, 30 years old. Address: Box 914, The FOUNDRY, Cleveland 13, Ohio.

FOUNDRY SUPERVISOR

Desires connection with jobbing and production foundry. 30 years as molder and foreman. Now superintendent in foundry pouring 35 to 40 ton per day. Will make change about May 1st. Address: Box 912, The FOUNDRY, Cleveland 13, Ohio.

FOUNDRY SUPERINTENDENT

A-1 foundryman, practical with many years' experience in grey iron, semi-steel, brass, bronze and aluminum castings. Preferred southern or west coast states. Employed as foundry superintendent with good knowledge of ferrous and nonferrous practices, also centrifugal and precision castings. Address: Box 887, The FOUNDRY, Cleveland 13, Ohio.

FOUNDRY EXECUTIVE

Capable, progressive grey iron foundryman now employed desires to make a change. Have 23 years of experience covering all phases of the business. Understand foundry costs thoroughly and can apply this knowledge to very good advantage. Desires to make a contact with an organization who wishes to secure ambitious, capable and honest man. Age 44 years. Address: Box 876, The FOUNDRY, Cleveland 13, Ohio.

Positions Wanted

PATTERN SHOP SUPERVISOR WOOD & METAL

Six years' experience in corporation shop; 23 years in jobbing shop; 5 years successful owner and manager of bronze and aluminum foundry. Address: Box 846, The FOUNDRY, Cleveland 13, Ohio.

GRAY IRON FOUNDRY MANAGER OR SUPERINTENDENT

Thoroughly versed in all departments, technical and practical. Maximum results guaranteed. Middle age, married and good health. Address: Box 924, The FOUNDRY, Cleveland 13, Ohio.

FOUNDRY SUPERINTENDENT

Thirty-two years' foundry experience, Twenty-five years as foundry superintendent. Capable of taking complete charge of all foundry operations, both ferrous and nonferrous. Technical and practical training. Good connection more important than a large salary. Address: Box 919, The FOUNDRY, Cleveland 13, Ohio.

FOUNDRY SUPERINTENDENT

Twenty-five years' experience in aluminum and magnesium foundry. General experience in steel practices, production methods, handling of men, etc. Familiar with general foundry practices, foundry equipment methods and controls. Address: Box 920, The FOUNDRY, Cleveland 13, Ohio.

FDY adv 578 5½pt 2-25 CLEMENS——

SALES AND ADVERTISING MANAGER

In aluminum sand and permanent mold foundry. Highest references. Proven results. Address: Box 910, The FOUNDRY, Cleveland 13, Ohio.

Accounts Wanted

ACCOUNTS WANTED

Foundry equipment and materials accounts wanted by well organized sales company covering entire foundry industry on Pacific Coast. We are making appointments for interviews at AFA Convention, Philadelphia. Address: Box 854, The FOUNDRY, Cleveland 13, Ohio.

ACCOUNTS WANTED

Foundryman of long experience, now a manufacturer's agent, servicing ferrous and nonferrous foundries, desires accounts for foundry needs, namely—foundry supplies, equipment, molding sand, metals, etc. Ohio and Western Pennsylvania. Commission basis.

BOX 883
The FOUNDRY CLEVELAND 13, OHIO

FOUNDRY EQUIPMENT AND SUPPLY SALESMAN

Experienced foundryman with following, now covering Iowa, Eastern Missouri and Illinois (outside of Cook County) wants one or two additional, substantial, non-conflicting lines. Devoting full time to territory. Offer must have reasonable earning possibility. Address Box 891, The FOUNDRY, Cleveland 13, Ohio.

CASTINGS ACCOUNTS WANTED

Long, well established manufacturer's agent covering the Michigan and Northern Ohio area is desirous of obtaining additional lines of castings, forgings or stampings. Address: Box 880, The FOUNDRY, Cleveland 13, Ohio.

Open Capacity

AVAILABLE CAPACITY

Our foundry has open capacity to supply small and medium size gray iron castings. Send sample. Address: OREGON CASTINGS CO., RD 3, Lititz, Pa.

CASTINGS

Grey Iron—1 lb. to 2 tons. Address: RICHARD MACHINE WORKS, INC., 307 S. MAIN ST., NORFOLK 6, VA.

Classified Advertising

Open Capacity

CASTINGS

Grey Iron

10 to 300 lbs.

FISHER & NORRIS
TRENTON, N. J.

OPEN CAPACITY

Open capacity in grey iron foundry. Waterfronts—burners—bench, pumper and floor work. Address: P.O. Box 321, Belleville, Illinois.

CAPACITY

Company with automatic sand handling foundry for squeezer work desires a connection with user of volume products. Address: Box 792, The FOUNDRY, Cleveland 13, Ohio.

CASTINGS AND MANUFACTURE

Gray iron, brass and aluminum castings, light stampings, assembly, machine shop and engineering design if necessary. Address: MR. N. H. MINGLEDORF, SAVANNAH MACHINE & FOUNDRY CO., SAVANNAH, GEORGIA.

Capacity Wanted

CASTINGS TO PLACE

Manufacturer's representative has ten ton on down, semi-steel castings to place fairly near to Cleveland. Can you figure on this work?

"EV" JONES
600, WILLIAMSON BLDG.
CLEVELAND, OHIO

Foundry Consultant

ATTENTION: GRAY IRON FOUNDRIES

Are you having cupola trouble such as cold iron, slow melting, a low melting ratio, extreme lining burning? Write for circular. Address: MR. HENRY MESSER, 1117 WILLOW AVE., SOUTH SAN FRANCISCO, CALIFORNIA.

Opportunities

90 PER CENT OF THE CUPOLAS MELT UP TO ONLY 50 TO 60 PER CENT

capacity per hour—although the best and hottest iron is produced only when cupola is operated to its capacity. Report on your cupola may prove an eye-opener—usually the savings are surprising. Every pound of steel used in cupola mixtures reduces cost and increases strength 20 to 60%, because steel is purer than the most expensive pig iron. Watch the scrap pile—statistics prove casting losses can be held between 1 to 5% depending on the line of work. Our system is not an expense—but a valuable investment. Synopsis free.

McLAIN'S SYSTEM INC.
236 E. NORTH AVE.
MILWAUKEE, 12, WIS.

CONTROLLED COMBUSTION FOR CUPOLAS

Melts iron hotter and cleaner with less oxidation. Reduces the melting zone burn out and eliminates bridging, giving a cleaner drop. The melting rate can be increased 25% on large or small heats. Literature on request.

ZIPPLER TUYERE SYSTEM
19302 RIVERWOOD AVE.
ROCKY RIVER 16, OHIO

OPPORTUNITY

We can furnish empty tight and slack wooden barrels also steel drums for your products. ADDRESS: BUCKEYE COOPERAGE STATION, C.P.O. BOX 1501, CLEVELAND, OHIO.

Opportunities

COPPER FERRITE CASTINGS

Sales representatives for copper ferrite castings wanted in New York, Pennsylvania, New Jersey, Illinois and Indiana. Other territories also open for consideration. For further information write:

OLD COLONY FOUNDRY COMPANY
EAST BRIDGEWATER, MASS.

FOUNDRY EXECUTIVE

Capable of completely operating and managing grey iron foundry with reasonable amount of capital to invest in it. Foundry now operating. Have materials and customers. Address: Box 859, The FOUNDRY, Cleveland 13, Ohio.

PATTERN SHOP

Fully equipped growing business in Eastern Massachusetts. Complete with stock, machinery and orders on hand. Owner has other interests. Price—$7500. Address: Box 908, The FOUNDRY, Cleveland 13, Ohio.

Foundries For Sale

MACHINE SHOP AND FOUNDRY

In continuous operation since 1888 this plate construction and heavy machinery plant, with foundry attached, contains an operating machine shop fully equipped with boring mills, planers, engine lathes, turret lathes, radial drills, slotters, millers, shapers, grinders, welders, cranes, etc.

Foundry with one 96" cupola, one 60" cupola, has pattern shop with storage space, traveling cranes and complete related equipment for producing grey iron and semi-steel castings up to 50,000 lbs.

Six acres of land located in Ohio on main lines of the New York Central and Pennsylvania railroads. 104,000 sq. ft. building space which, except for pattern shop, is completely served by spur track.

Principals only.

J. L. ARNOLD
P.O. BOX #1
BOSTON, MASSACHUSETTS

FOUNDRIES FOR SALE

Gray iron foundry. Fully equipped and operating. Profitable business. Price $125,000. Also have smaller foundries to offer.

EDWARD H. ZOLL
790 BROAD ST. NEWARK 2, N. J.
PHONE—MARKET 3-4537 & 3-4539

FOUNDRY FOR SALE

Located in Michigan in city of 175,000 population, centrally located. Foundry and yards cover ¾ of block area. Capacity 25 tons per day of light squeezer castings. Buildings in first class condition. Overhead charger, 20,000 sq. ft. of molding space, 24,000 sq. ft. of core room and storage space. Gas ovens, core blowers, sand mixers. Separate building with 3600 sq. ft. of storage and pattern millwright and carpenter shop equipped. Address: Box 853, The FOUNDRY, Cleveland 13, Ohio.

FOR SALE

Foundry and machine shop, 70 years continuous business. Owner 72 years old wishes to retire. Machine shop equipped with lathes 60" and smaller. Foundry two 36" cupolas, electric cranes. Planer 48" down, boring mill 112" down. Major work building cane mills for foreign countries. Patterns for A.W. W.A. New York pipe specials, lamp post and municipal castings. Will lease or sell.

THOMPSON FOUNDRY & MACHINE CO.
THOMASVILLE, GA.

Foundries For Sale

GRAY IRON FOUNDRY

If you are interested in securing large well equipped foundry at real bargain, location Middle West, write: Box 858, The FOUNDRY, Cleveland 13, Ohio.

FOR SALE

Grey iron foundry. Equipped for production and jobbing work. Capacity 40 tons. Thirty years in business. Ideal location in Midwest industrial area. Now melting ten tons per day for eight large industrial plants. Good labor conditions. Excellent scrap supply locally. Owner in poor health. Address: Box 903, The FOUNDRY, Cleveland 13, Ohio.

MODERN ALUMINUM FOUNDRY

For sale or lease or good man to manage same. Located in middle of tractor manufacturing area. New Building and mechanized equipment. Very good reason for sale. Terms. Address: Box 892, The FOUNDRY, Cleveland 13, Ohio.

FOR SALE

Gray iron foundry, Northeastern Oklahoma. Operated continuously since 1910. Fully equipped, leased rail siding, pattern coke and sand storage. Doing good business. Address: Box 840, The FOUNDRY, Cleveland 13, Ohio.

FOR SALE

Small foundry, Northeastern Pennsylvania. Now operating, priced for quick sale. Address: Box 893, The FOUNDRY, Cleveland 13, Ohio.

GREY IRON FOUNDRY FOR SALE

Complete with pattern and machine shop. Going business with 27 years' successful operation. Ideal location in growing industrial section of Texas. Well established demand for product. Price $125,000. Terms. Address: Box 612, The FOUNDRY, Cleveland 13, Ohio.

NOTICE OF SALE

Will offer for sale the foundry known as "The George Messenger Foundry, Dunkirk, Ohio" equipped for brass, aluminum and grey iron castings. Call: 43 AT FOREST, HARDIN COUNTY, OHIO OR WRITE: J. E. SIMPSON, ATTORNEY, FOREST, OHIO.

Wanted To Lease

WANTED

TO LEASE

GREY IRON FOUNDRY

Capacity 50 tons daily

(or greater)

Raw materials can be furnished.

BOX 915

THE FOUNDRY CLEVELAND 13, OHIO

Wanted-To-Buy

WANTED

Core blower, suitable for 2# production work; patterns for soil pipe fittings 2" to 6", aluminum snap flasks, etc. Address: Box 861, The FOUNDRY, Cleveland 13, Ohio.

WANTED

Sand cutter—American—45" to 60" blade. Type "AA" or "AM". Address: RICHARD MACHINE WORKS, INC., 307 S. MAIN ST., NORFOLK 6, VA.

WANTED TO BUY

10 to 15 core sand rammers, new or used, small size. Address: Box 905, The FOUNDRY, Cleveland 13, Ohio.

WANTED

Ajax induction melting furnace complete, 100 to 500 pound iron capacity. Address: Box 909, The FOUNDRY, Cleveland 13, Ohio.

Classified Advertising

Wanted-To-Buy

MIXERS WANTED

Used Simpson Intensive Sand Mixers. State size, condition and lowest cash price for immediate acceptance. Address Box 578, The FOUNDRY, Cleveland 13, Ohio.

Employment Service

SALARIED PERSONNEL

$3,000—$25,000. This reliable service, established 1927, conducts confidential negotiations for high-grade men who seek a change of connection under conditions assuring, if employed, full protection to present position. Send name and address only for details. Personal consultation invited. Address: JIRA THAYER JENNINGS, 241 ORANGE STREET, NEW HAVEN 10, CONN.

SALARIED POSITIONS

$3,500—$35,000

If you are considering a new connection communicate with the undersigned. We offer the original personal employment service (38 years recognized standing and reputation). The procedure, of highest ethical standards, is individualized to your personal requirements and develops overtures without initiative on your part. Your identity covered and present position protected. Send only name and address for details.

R. W. BIXBY, INC.
101 DUN BLDG. BUFFALO 2, N. Y.

For Sale

OVERHEAD ELECTRIC TRAVELING CRANES

TONS	MAKE	SPAN	CURRENT
3	Shepard	18'6"	230-VDC.
3	Northern	36'0"	220-VAC.
5	Northern	22'0"	230-VDC.
5	Northern	26'0"	230-VDC.
5	Milwaukee	50'0"	230-VDC.
15	Alliance	102'0"	220-VAC.

(With (2) 7½-ton Trolleys)

ELECTRIC MONORAIL HOISTS

QU.	TONS	MAKE	CURRENT
?	½	Lo-Hed & Shepard	230-VDC.
1	1	Shaw-Box	220-VAC.
1	2	Shepard	230-VDC.
1**	2	Shepard	220-VAC.
1*	2	Shepard	230-VDC.
3*	3	Lo-Hed	230-VDC.
1*	5	Lo-Hed	220-VAC.

*—2-Motor, Fl. Op. **—2-Motor, Cg. Op.

ALL ABOVE IN STOCK OFFERED REBUILT & GUARANTEED.
SEND FOR OUR STOCK LIST OF A.C. & D.C. GENERAL PURPOSE CRANE & MILL MOTORS, ELECTRIC BRAKE & CONTROL EQUIPMENT, MOTOR GENERATOR SETS, TRANSFORMERS, ETC., OF ALL SIZES.

T. B. MACCABE COMPANY
4300 CLARISSA ST.
PHILADELPHIA (40), PENNA.

FOR SALE

#2 18 ton press-rite press

2 HP 1140 RPM 3 phase motor

3 phase starter with overload protection

GREEN COMPANY

617 W. MAIN LOUISVILLE, KY.

WABASH 8328

FOR SALE

1—1¼ yard Hayward motorized bucket. Approximately 9' high overhauled and in good condition. Price only $750.00. Address: LUFKIN FOUNDRY & MACHINE CO., LUFKIN, TEXAS

For Sale

FOR SALE

1—Sly Dust Collector—13,600 FM
1—A-2 Hebard Shop Mule
1—A-4 Brinnell tester
1—1½ Ton Cleveland Crane with Monorail and Hoist
2—No. 4 Fox 2 Speed Swing Grinders
1—3—R W Hammond Grinder
10—8 Point Recording Controller Potentiometers
1—5' x 8' Simplicity Shakeout with Feeder
10—Sets Combustion Equipment including Burners, Blowers, Motors and Electrical Equipment.
Complete tool room steel shelving.
THIS EQUIPMENT MUST BE SOLD IMMEDIATELY—REAL BARGAINS—

WHITEHEAD, SANGER & HOIDGE
36 WEST 40th STREET
NEW YORK, N. Y.

FOR SALE

1—Johnston & Jennings #401-C Portable Jolt Squeeze Molding Machine like new. Price $450.00.
10—Osborn #275-J Portable Jolt Squeeze Molding Machines. Prices $200.00 to $250.00 each.
2—36" x 60" Royersford Exhaust Type Chain Driven Horizontal Tumbling Mills—1" steel shell—C.I. bearing stands with worm gear reduction units complete with hand brakes—5 H.P. 220 Volt 3 Phase 60 Cycles Fairbanks-Morse induction motors and Allen-Bradley A.C. auto starters. Price $900.00 each.

THE G. & C. FOUNDRY CO.
SANDUSKY, OHIO

OVERHEAD CRANES

1—6 ton Morgan, 46'6" span, cab operated 230 volts D.C.

2—10 ton American Monorail, floor operated 3/60/220 A.C.—WITH RUNWAY.

IRON & STEEL PRODUCTS, INC.
43 years' experience
13444 S. Brainard Ave., Chicago 33, Ill.

"ANYTHING containing IRON or STEEL"

WHITING CUPOLA CHARGER

In good operating condition. Skip hoist type for #6 cupola. Complete with motor (220-3-60) controller, cables, bucket and steel work. Can be seen near Philadelphia. Price $1750.00, as is, where is.

S. R. VANDERBECK
731 COMMERCIAL TRUST BLDG.
PHILADELPHIA 2, PENNA.
RITTENHOUSE 69288

FOR SALE

1—18" x 25" Roots-Connersville positive pressure blower with 125 H.P. motor.
1—Motor operated Butterfly valve.
4—3 Ton Whiting steel converter shells with 2 tilting assemblies.
2—Champion 48" x 48" x 8" draw power flask push-off machines.
1—Osborn Jolt, rollover, draw molding machine.
3—Osborn Jolt strip molding machines.
2—Nichols Jolt, squeeze molding machine.
1—Nichols Jolt table.
2—Osborn Jolt, rollover squeeze molding machine.
1—3' x 5' Simplicity shakeout machine.

GUNITE FOUNDRIES CORP.
ROCKFORD, ILL.

For Sale

TURBO BLOWERS

2100 cfm @ 10 oz. Spencer, with 10 HP, 220/440 V. 3/60/3600 RPM motor.
(4) 675 cfm @ 6 oz., Spencer, driven by 2 HP, 220/440 V., 3 ph. 60 cycle 3600 RPM.

ALSO MANY PRESSURE BLOWERS NOT LISTED

HOISTS

¼ Ton—Detroit Titan—440/3/60
¼ Ton—Budgit—220/3/60
¼ Ton—Comet—440/3/60
¼ Ton—Shepard—220 D.C.
½ Ton—Chisholm Moore—440/3/60
½ Ton—Cleveland—440/3/60

THE MOTOR REPAIR & MFG. CO.
1552 HAMILTON AVENUE
CLEVELAND 14, OHIO

FOR SALE

7 SPO NO. 305 PORTABLE
JOLT STRIPPER MOLDING MACHINES

Subject to prior sale, complete with necessary valves, vibrator, automatic line lubricator, lubrication fittings, ready to attach air supply line to operate. Also

7 SPO NO. 506 PORTABLE JOLT
ROCKOVER PATTERN DRAW MACHINES

Complete with necessary valves, 1¼" vibrators, automatic line lubricator, lubrication fittings, ready to attach air supply line to operate.

THE BUCKEYE INCUBATOR CO.
P.O. BOX 299 SPRINGFIELD, OHIO

FOR SALE

Cast iron core oven car frame 12 ft. x 6 ft., gauge 33 inches.
Core oven racks with double 8 wheel Louden trolleys.
Double end Norton grinders, Model D, 16 inch wheel
Steel stack 4 foot diameter 44 feet high—also structural steel base for same.

BUFFALO SCALE COMPANY, INC.
BUFFALO 13, NEW YORK

FOR SALE

OVEN—Mahon Mfg.—Continuous conveyor type complete—size 4'8" x 52" x 32' long
DUST COLLECTOR—#65 Pangborn
WHEELABRATORS—Tumblast and tablast types
LABORATORY SCALES—Like new
INTENSIVE SAND MIXERS

Inquiries Invited

BALCHER MACHINERY SALES
1819 E. 33RD ST. CLEVELAND 14, OHIO
Telephone: HEnderson 1765

FOR SALE

#9 Whiting cupola, late model	$2500.00
Roller conveyor, ball bearing, almost new, random lengths, 8 to 10 ft. Per ft.	2.80
Buffalo MX blower, flat belt drive, not motorized	55.00
20 x 22" International portable jolt strip molding machine	250.00
14" x 18" Osborn jolt squeeze molding machine	165.00
17 x 21" Milwaukee portable jolt squeeze molding machine	140.00

BILLARD MACHINE & TOOL CO.
PHONE 44 MANSFIELD, PA.

FOR SALE

Machine shop tools released for private industry:— 36" band saw $225, 30" band saw $275, 32" band saw with built-in 220/3/60 motor $500. Pressure blower 1½" pipe size $20. Time clock for 100 employees $50. 25" disc grinder like new $250. Pangborn small sand blast outfit $230. Flexible shaft grinder 220/3/60 motor, like new $120. 24" x 10' engine lathe $490. 24" x 8'—$340. 18" x 8'—$240. Money back guarantee. Address: CONVERSION PARTS CO., 288 Adams St., Boston 22, Mass.

Classified Advertising

For Sale

FOR SALE

1—Fisher 4-Burner gas fired Type SM 500 Serial No. 2517 Tilting with Spencer-Turbo Blower and Motor. This furnace also has one (1) oil burner as auxiliary. Price complete $500.00
1—Osborn #410-2 Jolt Rollover Molding machine with leveling device. Serial No. 73201, 30" long, 16" wide—Price $500.00
2—Bullseye Tilting Wet Mills, 18" wide at top, 24" wide at bottom, 24" deep, with motors. Each $325.00
1—No. 1 Demmler Core Blower, Serial #888, Like New—$650.00
1—Royer Sand Separator and Blender like new. Serial #2902, Order 903, Steel Wheels. $350.00
1—Motorized Kane & Roach Wire Straightener, Capacity ⅛" to ½" wire. Excellent $400.00
1—Complete Sand Blast Room, 13' by 13' by 10' with Dust Arrestor—$2,000.00
8—Bowers Tumbling machines, complete with ¾ HP US Synrogear Motors, Ratio 31:3, RPM 56, Motor RPM 1800, 3/60/208-416 volts. Price—$225.00 each.
3—Osborn Jolt Rollover Molding Machines, Model 2047, each $1250.00
1—American Cabinet Model Wheelabrator, BM-79000. Serial No. A-55534—$2750.00
1—Simplicity Shake Out, Model SS, 5' x 3' x 10' —$850.00

We also BUY Used Foundry Equipment. Send for our New List No. 6, of Foundry Equipment in Stock.
Conveyors, Scales, etc. on hand at all times.

R. B. HARRISON
UNIVERSAL MACHINERY & EQUIPMENT CO.
320 EAST BROAD ST.
SHILLINGTON, READING, PA.

FOR SALE

1—International squeeze roll over-draw moulding machine, Price $547.00.
1—International jolt squeeze strip moulding machine, type PKT-Size 16-8 Ser. #49514, Price $675.00.
1—Champion jolt squeeze strip moulding machine size JSL-12P Ser. #6645, Price $248.00.

All in A-1 condition—price f.o.b. St. Joseph.
Write or call:

NYLEN PRODUCTS COMPANY
ST. JOSEPH, MICH.

TWO USED CONNERSVILLE CUPOLA BLOWERS

1—Output 65 cu. ft. per rpm, measuring 24" inlet, 16" outlet.
1—Output 24 cu. ft. per rpm, measuring 18" inlet, 6" outlet.

Make offer.

GEO. J. MEYER MANUFACTURING COMPANY
SOUTH MEYER PLACE & EAST DUMORE COURT, CUDAHY, WISCONSIN

FOR SALE

3' x 6' Model "SS" single deck Simplicity shake-out machines, line load capacity, 1000 pounds; with totally enclosed, fan-cooled motors, arranged for Texrope Drive. Motors 440 volt, 60 cycle, 3 phase. Good condition.

COLUMBIA MALLEABLE CASTINGS CORP.
COLUMBIA, PA.

FOR SALE

1 pair 33" x 54"

Steel Exhaust Tumbling Barrels

Spur Gear Drive

THE SOUTHERN DESK CO.

HICKORY, N. C.

---

6 ton Capacity
HEROULT ELECTRIC FURNACE
Tilting Type
1, 6 ton shell—1, 3 ton shell
Complete with all electrical controls.
IRON & STEEL PRODUCTS, INC.
43 years' experience
13444 S. Brainard Ave., Chicago 33, Ill.
"*ANYTHING* containing IRON or STEEL"

For Sale

FOR SALE

TUMBLING BARRELS

2 ea. Crown Rheostat & Supply Co. Length 46", Dia. 43", two Compartments, 2 doors, side fill, 3 HP U.S. Syncrogear Motor.

BLASTING BARRELS

2 ea. Pangborn—Type 2 G F

All of above in very good condition. PRICED TO SELL.

QUINN-STEEL PRODUCTS
911 FIDELITY BLDG. BALTIMORE 1, MD.
SARATOGA 2830

FOR SALE

1—Gehnrich continuous horizontal double pass core oven, 92 ft. long.
1—No. 40 speedmuller without motor.
3 Royer and 1 Jeffrey sandblender.

MARCH BROWNBACK CO. INC.
SOUTH AND CHARLOTTE STS.
POTTSTOWN, PA.

FOR SALE

Waite & Bartlett 220 volt—type 722—X-Ray machine with instruments and parts, housing and development room.

OLD COLONY FOUNDRY CO.
EAST BRIDGEWATER, MASS.

FOR SALE

1 Model 8 Screenarator #1903 (Beardsley & Piper) 2½ HP, 220 volt, 60 cycle, 3 phase motor. Pneumatic tires, ½ sq opening screen.	$200.00
1 Small Pangborn Sand Blast.	$50.00
2 Molding Benches (Champion).	$50.00 ea
1 5 HP, Gasoline Engine.	$100.00

F.O.B. Omaha, Nebraska

UNITED BRASS FOUNDRY
OMAHA, NEBRASKA

FOR SALE

1—Whiting #9½ Model B Cupola section E 45' with Tuyeres. Self segments, arranged for 9" thick lower lining, C.I. charging door frame wishbone and grapple.
1—3 Ton capacity Horseshoe charging trolley 11' span 34' lift equipped with GE 3 HP and 15 HP traction and lift slip ring motor 3-60-220 60 FPM drum controllers, resistance grids, including switches, trolley system, etc.

BOX 523
THE FOUNDRY CLEVELAND, 13, OHIO

FOR SALE

New heavy duty motorized rod cutter, 65 cuts per minute; capacity: ¾ inch round hot rolled steel. Brand new. $890.00 f.o.b. Cleveland. Address: The Federal Foundry Supply Co., 4600 East 71st St., Cleveland 5, Ohio.

FOR SALE

3 new and 10 used size #1 core sand rammers. Offered at large saving. Address: Riverside Foundry, Bettendorf, Iowa.

For Sale

EQUIPMENT FOR SALE

MOLDING MACHINES
4—75J Osborn Jolt Squeeze
2—SPO #611-B Stationary Oscillating Squeeze Strippers
1—SPO #4½ JHS Air Jolt Hand Strip
2—Tabor Plain Squeeze, Strain Rod Type
3—Mumford 3" Cyl. Core Jolt, with 20" x 15" Table
1—Tabor Combination Jar Rollover Pattern Draw, 40" x 50" Table, 21" Draw. Capacity 2000 lbs.

BLOWERS FOR CUPOLAS AND FURNACES
1—16 x 24 HD Connersville 2500 CFM at 5 lbs.
6—#805 General Blowers, 5 HP, 3/60/220, 1400 CFM at 8-oz. pressure
1—16 x 48 Connersville rotary blower—4500 CFM
Maxon-Premix Blowers for Gas, ⅛ to 1 H.P.

METAL MELTING EQUIPMENT
1—Recirculating Gas Fired Oven with all controls, suitable for Core Oven
1—Style #600 Single Burner Tilting #150 Crucible Furnace for Gas, complete with lining and #7 Blower and Motor—220 Volt
2—Hausfeld 1000# Aluminum Capacity Furnaces, Barrel Type, Open Flame, Oil Fired
2—Hausfeld 2000# Aluminum Capacity Furnaces, Barrel Type, Open Flame, Oil Fired
1—Aluminum Electric Heat Treating Unit, 75 KW, 220 Volt, Batch Type, with Basket and Quench Tank
2—Hausfeld Open Flame Tilting Brass Furnaces, 400# Capacity, Gas or Oil
3—Stationary Gas Fired #60 Crucible Furnaces, with ¼ H.P. Maxon-Premix Blowers
2—Monarch-Rockwell Rotating, 500# Brass. Oil
1—60" Dia. Shell Cupola. One year old.
New 32" to 41" Dia. Shell Cupolas made to order

TUMBLING MILLS AND SAND BLAST
1—Pangborn #2 Barrel, Suction Feed, Motor Drive, Complete
1—American Foundry Equipment Co. Stationary Cabinet Type Wheelabrator, complete with Elevator and all Motors
1—American Foundry Equipment Co. Wheelabrator, 45" Dia. Table, Complete with Motors
1—Sly 42" x 60" Exhaust Tumbling Barrel
1—Sand Blast Room, 10' x 10' x 6½'
4—New Haven 36" x 46" Self Contained Sand Blast Barrels, Belt Drive.
2—Pangborn Syphon Feed Sand Blast Cabinets
3—Portable Sand Blast Generator Tanks, 500# Sand Capacity
1—Battery of (4) 24 x 42 Tumbling Mills on Common Stands

1—Mono-Rail System Complete with approximately 1200 ft. of track, 74—250# capacity 110 Volt hoists, two and four wheel trolleys, switches, 35—2000# 20 ft. bridges, and all necessary parts to install.

MISCELLANEOUS
1—(New) Type "D" #14 Roto-Clone Dust Collecting System, complete with Booth, Blower, 7½ HP Motor, Collecting Hopper and After Cleaner.
1—Model "M" Beardsley-Piper Screenerator, 3 H.P., 220 Volt, 3 Phase, on Rubber Tires
30—Jib Cranes, Floor Type, 1000 to 4000 lbs. capacity, 180° swing, 10 to 15 ft. arms
30—1000 lbs. Capacity Budget Electric Hoists
5—Sturtevant Dry Type Dust Collector Exhausters, 12500 CFM with 25 H.P. Motors
5—Low Lift Electric Trucks, 2000 lbs. capacity and up. Riding Operator Style
1—Heavy Duty Back Geared Sprue Cutter, 1½" square knives, T & L Pulley Drive
6—Worm Geared Tilting Ingot Mold Stands, 6' to 12' Long
1—Sly 10' x 28' x 7' Sand Blast Room complete with mechanical shot handling and four 5-Ton cars.
1—Beardsley & Piper Stationary Hydraulically-controlled Speedslinger, 10' to 20' radius swing, 60 HP ramming motor.
Miscellaneous Electrical and Gravity Conveyor Systems

CLIFTON MACHINERY CO.
1023 W. 6th ST. CINCINNATI 3, OHIO
PHONE PARKWAY 7812

Classified Advertising

For Sale

FOR SALE

BEARDSLEY & PIPER SLINGER

One Beardsley & Piper Co. motor driven hydraulically controlled speed slinger equipped with 25 tons stationary tank, standard tower, arms 14'0" and 7'6", lowering and raising from 4' to 7'5", 22" head, 5" tip, 440 volt, 60 cycle, 3 phase. Ramming capacity up to 2,000# per minute. Track gauge 4'8½". Acquisition cost—$24,350.00. Has been used two years. Ready for use and delivery now.

SAND PREPARATION PLANT

Sand Preparation Plant manufactured by National Engineering Co., consisting of two 35 ton and one 25 ton sand bins located above two #3 Simpson mixers with enclosed gearing Flak speed reducers and a 40 HP, 1200 RPM, 440 volt, 3 phase, 60 cycle motor.

Mixers are arranged to dump onto a 20" x 67' conveyor belt which discharges onto a 20" x 28' incline conveyor belt carrying the sand in the sand buckets.

Sand is shaken out onto a floor grating which discharges onto a 30" x 72' style D, Union steel apron conveyor which discharges onto an incline 20" x 107' conveyor having a #1812 Stearns high duty magnetic pulley at the discharge end.

At this point the sand is discharged into a hexagonal screen 5'x3'x7' long perforated with ⅝x 14" openings. The good sand is discharged into the boot of a 35' vertical elevator which has 52, 12"x7' Style A malleable iron buckets. The elevator discharges onto a 20"x110' conveyor which discharges into the two 35 ton and the one 25 ton bins.

All equipment is complete with motors and speed reducers, cyclone dust separator, exhaust fan and hoods and other equipment.

LECTROMELT FURNACE

One Pittsburgh Electric Furnace Corp. 'Lectromelt furhace, size 18, type C, rated capacity 3 tons with practically new transformer 2000KVA, 13,200 to 225 volt, slant 90 with motor operated tap changing equipment.

PANGBORN CASTING WASHER

One Pangborn Casting Washer, steel room—25' long x 25' wide x 17'9" overall height constructed of ¼" plate and heavy structural steel frame. Has 15'x16' front door and ceiling door 16'x18', one 12' diameter rotative table, 50 ton capacity.

One centrifugal pump, Type ML, 400# pressure and 300 GPM, driven by 150 HP, 3600 RPM 440 volt, 3 phase, 60 cycle motor.

OTHER MISCELLANEOUS FOUNDRY EQUIPMENT

MARION POWER SHOVEL COMPANY

MARION, OHIO

FOR SALE

NEW FOUNDRY EQUIPMENT

1—American Sand Cutter Model M 54" wheel
1—Oliver #75-A upright wood milling machine for pattern work, 20" x 20" Universal table, belt drive to spindle, 4 step cone lead, attached counter shaft and several cutters.
1—Johnson & Jennings, bumper table 50" x 42", built on Johnson & Jennings Company order no. 1270-284-2.
1—Beardsley & Piper 3½ Cu. ft. Mulbarrow, serial no. MB 30-115 2½ H.P. Motor
1—Extra Wheelbarrow for above.

THE JAEGER MACHINE CO.
550 W. SPRING ST.
COLUMBUS 16, OHIO

For Sale

FOR SALE

1—Ransohoff end-loading, end-unloading star return mill for wet milling. 36" x 36" tumbling compartment.
5—Johnson & Jennings, number 401-C, Jack Rabbit portable jolt squeeze machines.

THE RIDGE TOOL CO.
P.O. BOX 270
NEW PHILADELPHIA, OHIO

FOR SALE

1—Pallet Conveyor, Jeffrey No. 24, 360 ft. of track, motors, 59 cars, elevation above floor 24", cars are spaced 72½", car tops are 48" wide x 60" long of ⅝" steel hydraulic rams pushes molds off conveyor to shake-out.

OLD COLONY FOUNDRY CO.
EAST BRIDGEWATER, MASS.

FOR SALE

Simpson type "O" intensive muller type mixers 300# batch size, complete with gear reduction but without motors, 300# muller. Price $678 each f.o.b. Cincinnati. ADDRESS: PLANT EQUIPMENT CO., 946 BETTS STREET, CINCINNATI 14, OHIO.

FOR SALE

1947 Macleod sand blast No. 439 type H. 800 pound sand capacity. Will sell for $150.00. Address: HOUPT MEMORIAL SHOP, 132 High Street, Marion, Ohio.

FOR SALE

Two (2) Monarch simplex rotary brass or aluminum furnaces available on skids for immediate shipment. 2000# capacity with new lining and blower for oil or gas $1475; 700# capacity (less blower) $450. Also a few other miscellaneous pieces of iron and aluminum foundry equipment for sale cheap. Address: Box 862, The FOUNDRY, Cleveland 13, Ohio.

FOR SALE

Whiting standard No. 1B cupola, stack dia. 32", overall height 45', includes spark arrestor and roof hood less blower. Never been used. For complete details address: (K. O. LEE COMPANY, ABERDEEN, SO. DAKOTA.)

FOR SALE

Discontinuing permanent mold operations, we offer for sale eight oil-fired Fisher furnaces; one Peterson melting furnace 500-lb. nominal capacity; one 150-lb. melting furnace; all equipped with Hauck burners, very little used; one 1500-lb. gas-fired Hones holding furnace; four 300-lb. gas-fired tilting furnaces. Address: Box 906, The FOUNDRY, Cleveland 13, Ohio.

For Sale

FOR SALE

1—Trent Electric Furnace with Brown Instruments, 3½ KW, 175 volts, 1 phase, 60 cycle, size MLR 4A, #60861.
1—Fisher 22" Tilting Furnace, take #275 crucible, equipped for gas firing.
1—Tilting Furnace, take #400 crucible, equipped for gas firing.
1—Eclipse Crucible Type Brass Melting Furnace, gas fired, catalog #200S.
1—Centrifugal Casting Machine and Motor, Centri-meco made, model SR-PR, serial No. 174.
1—Royer Shakeout Machine with Motor, 64" long x 52" wide, table 29" x 58".
1—Constant Heating Tank with motor and pump, with thermo controls.
1—Waage Air Pressure Wax Machine.
1—Osborn Rollover #203, take plates 36" x 50" with 8" draw, air clamps and air controlled table.

OLD COLONY FOUNDRY CO.
EAST BRIDGEWATER, MASS.

WHITING SIDE BLOW CONVERTERS

Two 3-ton side blow converters complete with blower, motors and accessories. Immediate delivery.

INTERNATIONAL FERMONT MACHINERY CO., INC.
111 BROADWAY, NEW YORK 6, N. Y.

GRAY IRON FOUNDRY STOCK FOR SALE

All or any part of the stock in a $200,000.00 gray iron foundry located in the Middlewest. Operating at full capacity with plenty of materials. Address: Box 884, The FOUNDRY, Cleveland 13, Ohio.

DINGS MAGNETIC SEPARATOR

Serial 18143—type 12 x 12 x M—equipped with ¾ HP motor—3 phase—60 cycle—440 volt AC—magnetic pulley—220 volts DC. Price right. For quick sale. Address: Box 904, The FOUNDRY, Cleveland 13, Ohio.

FOR SALE

We have in stock for immediate shipment a #22 Moline portable molding machine (brand new) also a used belt drive tilting tumbling barrel. Address: THE FEDERAL FOUNDRY SUPPLY CO., 4600 E. 71st ST., CLEVELAND 5, OHIO.

FOR SALE

1 American sandcutter serial #604R type A.A. size 4'8" with 7½ H.P. 220 motor. In excellent condition. $600.00 F.O.B. Escanaba, Michigan. ADDRESS: BAY FOUNDRY CO., ESCANABA, MICH.

CLASSIFIED ADVERTISING RATES

POSITION WANTED—Minimum advertisement set solid, 30 words, $2.00. Additional words 7c each.

ALL OTHERS—"Help Wanted"—"For Sale"—"Wanted"—"Personals"—"Services", etc., minimum advertisement set solid, 30 words or less, $4.00. Additional words 12c each.

NOTE—If replies are to be sent to a box number in care of THE FOUNDRY, add 6 words to your advertisement for box number and address.

Any advertisement set in all capital letters, add 50% to the above rates.

* * *

Classified advertising forms will close April 8th for the May Pre-Convention Issue.

IN CRUCIBLE TYPE MELTING FURNACE APPLICATIONS

CARBOFRAX Linings offer these Advantages

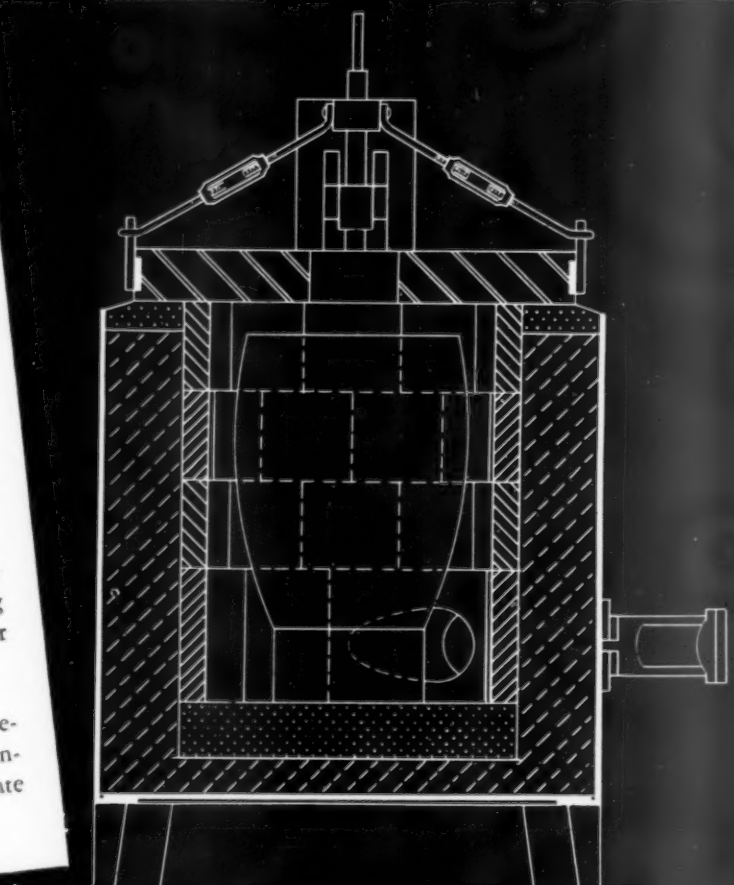
1 Reduced Lining Cost per ton of metal melted... figured in longer life of linings, less frequent patching, shorter time required for repairs and lower maintenance expense.

2 Easy Rapid Installation... rugged interlocking joints of accurate size tile insure lower installation cost *even with inexperienced labor.*

3 Use of Heavier Insulation... permitted by CARBOFRAX tile only 1¾" thick reduces heat loss through furnace wall—decreases fuel consumption.

4 Low Heat Capacity Furnace Structure... means faster melting rates, decreased fuel input, and greater production.

5 Improved Crucible Life... because CARBOFRAX linings maintain original diameter, the melting rate remains constant.



In hundreds of crucible type non-ferrous melting furnaces, CARBOFRAX silicon carbide linings regularly give these results. They are equally effective in oil, gas and coke fired stationary and tilting furnaces.

CARBOFRAX linings are not bothered by elevated temperatures. They possess high refractoriness. They strongly resist spalling, cracking and flame erosion. Because of such exceptional characteristics, they are well fitted to withstand a wide range of operating conditions; promote greater production at lower cost.

Specific information on CARBOFRAX linings for your melting furnace will be supplied without charge, of course. If you prefer, one of our engineers will gladly discuss the matter with you in person. Just write Dept. B-48. The Carborundum Company, Refractories Division, Perth Amboy, New Jersey.

SUPER REFRACTORIES

BY CARBORUNDUM

TRADE MARK

"Carborundum" and "Carbofrax" are registered trademarks which indicate manufacture by The Carborundum Company

ADVERTISING INDEX

A

Acheson Colloids Corp. ... 59
Acme Aluminum Alloys, Inc. ... 265
Acme Foundry Co. ... 270
Adams Co., The ... 24, 25
Aimes Co., Inc. ... 282
Air Reduction ... 30
Ajax Electric Co., Inc. ... 220, 221
Ajax Electric Furnace Corp. ... 220, 221
Ajax Electrothermic Corp. ... 220, 221
Ajax Engineering Corp. ... 220, 221
Ajax Metal Co. ... 220, 221
Allis-Chalmers Mfg. Co. ... 16, 47
Alloy Metal Abrasive Co. ... 271
Alter Co. ... 272
American Air Filter Co., Inc. ... 43
American Bridge Co. ... 268
American British Chemical Supplies, Inc. ... 284
American Gas Association ... 34
American Lacquer Solvents Co. ... 284
American MonoRail Co., The ... 199
American Optical Co. ... 48
American Smelting & Refining Co., Federated Metals Div. ... 31
American Wheelabrator & Equipment Corp. ... 106, 107, 219, 231
Angell Nail & Chaplet Co., The ... 261
Apex Smelting Co. ... 15
Arcade Mfg. Div., Rockwell Mfg. Co. ... 66

B

Babcock & Wilcox Co., The (Refractories Div.) ... 165
Baker Perkins Inc. ... 249
Baroid Sales Div., National Lead Co. ... 261
Bartlett, C. O., & Snow Co., The ... 181, 233
Bay State Abrasive Products Co. ... 105
Beardsley & Piper Co., The ... 194, 195, 197
Bedford Tool & Forge Co. ... 285
Bell Aircraft Corp. ... 213
Berkshire Mfg. Co. ... 284
Bethlehem Steel Co. ... 1
Blaw-Knox Div., of Blaw-Knox Co. ... 283
Bloomsbury Graphite Co. ... 259
Blystone Div., Standard Sand & Machine Co. ... 270
Buffalo Pattern Works ... 129

C

Campbell-Hausfeld Co., The ... 170
Cannon Vibrator Co. ... 284
Carbon Limestone Co., The ... 282
Carborundum Co., The ... 58, 229, 304
Carl-Mayer Corp., The ... 173
Carman, Edwin C., Inc. ... 282
Centrifugal Casting Machine Co. ... 269
Champion Foundry & Machine Co. ... 8, 9
Chicago Eye Shield Co. ... 254
Chicago Mfg. & Distributing Co. ... 20
Chicago Pneumatic Tool Co. ... 52
Chisholm-Moore Hoist Corp. ... 205
Christiansen Corp. ... 125
Clayton-Sherman Abrasives Co. ... 263
Clearfield Machine Co. ... 185
Cleco Div., of The Reed Roller Bit Co. ... 201
Cleveland Chaplet & Mfg. Co. ... 285
Cleveland Electro Metals Co., The ... 240
Cleveland Flux Co., The ... 187
Cleveland Formgrader Co., The ... 269
Cleveland Metal Abrasive Co., The ... 265
Cleveland Quarries Co, The ... 218
Cleveland Tramrail Div., of The Cleveland Crane & Engineering Co. ... 149
Cleveland Vibrator Co. ... 244
Climax Molybdenum Co. ... 246
Columbia Steel Co. ... 268
Columbus-McKinnon Chain Corp. ... 205
Corn Products Sales Co. ... 153
Crobaugh, Frank L., Co. ... 280
Curtis Pneumatic Machinery Div., of Curtis Mfg. Co. ... 307

D

Davenport Machine & Foundry Co. ... 112
Davey Compressor Co. ... 242
Dayton Oil Co, The ... 259
Dayton Pneumatic Tool Co. ... 268
DeBardeleben Coal Corp. ... 282
Delta Oil Products Co. ... 10
Demmler, Wm. & Bros. ... 61, 266
Denver Fire Clay Co., The ... 262
Despatch Oven Co. ... 247
Detroit Electric Furnace Co. ... 239
Detroit Testing Machine Co. ... 216
Diamond Clamp & Flask Co ... 241
Dietert, Harry W., Co. ... 139
Dings Magnetic Separator Co. ... 168
Dougherty Lumber Co. ... 248

E

Eastern Clay Products, Inc. ... 191
Eaton Chemical & Dyestuff Co. ... 272
Ebco Mfg. Co., The ... 234
Electric Furnace Co., The ... 284
Electro Metallurgical Co. ... 55
Electro Refractories & Alloys Corp. ... 260

F

Fabreeka Products Co., Inc. ... 183
Federal Foundry Supply Co., The ... 2, 266
Fisher Furnace Div., Lindberg Engineering Co. ... 27
Foundry Equipment Co., The ... 64, 65
Foundry Services Inc. ... 278
Foundry Supplies Mfg. Co. ... 253
Foxboro Co., The ... 225
Fox Grinders, Inc. ... 274
Freeman Supply Co., The ... 235
Fremont Flask Co., The ... 255
Frontier Bronze Corp. ... 35

G

Gardner-Denver Co. ... 40
General Electric X-Ray Corp. ... 116, 117
Giffels & Vallet, Inc. ... 157
Globe Iron Co. ... 271
Globe Steel Abrasive Co. ... 269
Great Western Mfg. Co. ... 178
Greene Electric Furnace Co. ... 282

H

Hauck Mfg. Co. ... 278
Haynes Foundry Equipment Co. ... 263
Herman Pneumatic Machine Co. ... 167
Hewitt-Robins Inc. ... 101
Hickman, Williams & Co. ... 196
Hines Flask Co., The ... 56, 57
Hough, Frank G., Co., The ... 227
Hughes-Keenan Corp. ... 240
Hydro-Blast Corp. ... 38, 39

I

Illinois Testing Laboratories, Inc. ... 114
Imperial Belting Co. ... 256
Independent Pneumatic Tool Co. ... 49
Industrial Equipment Co. ... 273
Industrial Pattern Works ... 169
Ingersoll-Rand Co. ... 162
International Graphite & Electrode Corp. ... 42
International Molding Machine Co. ... 127
International Nickel Co., Inc., The ... 99, 273
Ironton Fire Brick Co. ... 237

J

Jackson Iron & Steel Co., The ... 262
Jeffrey Mfg. Co., The ... 177
Johns-Manville ... 222
Johnston & Jennings Co. ... 223
Johnston Mfg. Co. ... 228
Joy Mfg. Co. ... 21

K

Kirk & Blum Mfg. Co., The ... 245
Krause, Chas. A., Milling Co. ... 179

ADVERTISING INDEX

L

Lancaster Iron Works ... 180
Landis Mfg. Co. ... 267
Lanly Co., The ... 207
Lindberg Engineering Co. ... 27
Linde Air Products Co., The ... 37
Link-Belt Co. ... Back Cover

M

Manhattan Rubber Division ... 192
Marshall, L. H., Co. ... 54
Master Pattern Co. ... 151
Master Pneumatic Tool Co., Inc., The ... 283
Mathews Conveyer Co. ... 123
Mathieson Alkali Works (Inc.) The ... Inside Front Cover
Metal Blast, Inc. ... 203
Miller-Taylor Tool Co. ... 274
Milwaukee Chaplet & Mfg. Co. ... 204
Milwaukee Foundry Equipment Co. ... 159
Modern Equipment Co. ... 308
Moline Iron Works ... 260
Molybdenum Corp. of America ... 144
Murphy, Jas. A., & Co. ... 264, 270
Murray, D. J., Mfg. Co. ... 271

N

National Carbon Co., Inc. ... 133
National Engineering Co. ... 28, 29
National Lead Co. ... 261
Neff & Fry Co., The ... 260
Newcomb-Detroit Co. ... 182
Niagara Falls Smelting & Refining Div., Continential-United Industries Co., Inc. 200
Nicholls, Wm. H. Co., Inc. ... 134
Norton Co. ... 161
North American Mfg. Co., The ... 251

O

Ohio Electric Mfg. Co., The ... 206
Ohio Ferro-Alloys Corp. ... 140
Oliver Machinery Co. ... 277
Osborn Mfg. Co., The ... 146, 147

P

Paddock Tool Co. ... 282
Pangborn Corp. ... 6, 7, 217
Parsons Engineering Corp. ... 280
Peerless Mineral Products Co. ... 278
Peninsular Grinding Wheel Co., The 62, 63
Penn Iron Works ... 272
Pennsylvania Foundry Supply & Sand Co. 266
Pioneer Mfg. Co. ... 250
Pittsburgh Crushed Steel Co. ... 281
Pittsburgh Lectromelt Furnace Corp. ... 190
Pittsburgh Metals Purifying Co. ... 262
Plaster Process Castings Co. ... 268
Porbeck Mfg. Co. ... 234
Pressed Steel Co., The ... 26
Pressure Cast Products Corp. ... 14, 155
Producers Core Sand Corp. ... 282
Propellair, Div., of Robbins & Myers, Inc. 184
Putnam, A. H., Co. ... 280
Pyrometer Instrument Co., The ... 280

R

Radium Chemical Co., Inc. ... 264
Randall Foundry Equipment Co., The 130, 131
Ransohoff, N., Inc. ... 175
Raybestos-Manhattan, Inc., Manhattan Rubber Division ... 192
Redford Iron & Equipment Co. ... 137
Reichert, W. G., Engineering Co. ... 228
Reinhold Publishing Corp. ... 232
Republic Coal & Coke Co. ... 279
Robins Conveyors Div., Hewitt-Robins Inc. 101
Robinson Clay Product Co., The ... 189
Roots-Connersville Blower Corp. ... 210
Rossborough Supply Co. ... 280
Rotor Tool Co., The ... 41, 281
Roura Iron Works, Inc. ... 264
Royer Foundry & Machine Co. ... 211
Ruemelin Mfg. Co. ... 176

S

Schneible, Claude B., Co. Front Cover, 50, 51
Schramm, Inc. ... 188
Scientific Cast Products Corp., The ... 258
Severance Tool Industries, Inc. ... 280
Shepard Niles Crane & Hoist Corp. ... 186
Silent Hoist & Crane Co. ... 236
Silverstein & Pinsof Inc. ... 171
Simonds Abrasive Co. ... 60
Skilsaw, Inc. ... 11
Sklenar Furnace & Mfg. Co. ... 18, 19
Sly, W. W., Mfg. Co., The ... 111
Smillie, C. M., & Co. ... 285
Smith Oil & Refining Co. ... 53
Smith & Richardson Mfg. Co. ... 273
Smith, Werner G., Co., The ... 4, 5
Smooth-On Mfg. Co. ... 277
Sonken-Galamba Corp. ... 212
Spencer Turbine Co., The ... 172
SPO Inc. ... 243
Standard Conveyor Co. ... 193
Standard Electrical Tool Co., The ... 277
Standard Horse Nail Corp. ... 224
Standard Silica Corp. ... 284
Steel Shot & Grit Co. ... 281
Sterling Grinding Wheel Div., The, of The Cleveland Quarries Co. ... 36
Sterling Wheelbarrow Co. ... 32, 230
Stevens, Frederic B., Inc. Inside Front Cover
Stratton Mfg. Co. ... 279
Stroman Furnace & Engineering Co. ... 23
Superior Flake Graphite Co. ... 202
Swan, Harry B. ... 284
Swartwout Co., The ... 267
Syntron Co. ... 252

T

Tabor Mfg. Co., The ... 12, 13
Tamms Silica Co. ... 236
Taylor, S. G., Chain Co. ... 174
Timken Roller Bearing Co., The ... 17
Toledo Matchplate Co. ... 268
Truscon Steel Co. ... 279

U

Union Carbide & Carbon Corp. ... 37, 55, 133
United Compound Co. ... 283
United States Graphite Co., The ... 142, 143
United States Rubber Co. ... 121
United States Steel Corp., Subsidiaries ... 268
United States Steel Export Co. ... 268
U. S. Reduction Co. ... 33
Universal Engineering Co. ... 46

V

Vanadium Corp. of America ... 119
Vonnegut Moulder Corp. ... 281

W

Weldron Silica Co. ... 230
Wellman Bronze & Aluminum Co., The ... 278
Wellman Engineering Co., The ... 284
Westinghouse Electric Corp. ... 44, 45
Westover Engineers ... 232
Wheland Co., The ... 109
Whiting Corp. ... 22
Wilson Industries ... 18, 19
Woodward Iron Co. ... 103

Y

Young Brothers Co. ... 257

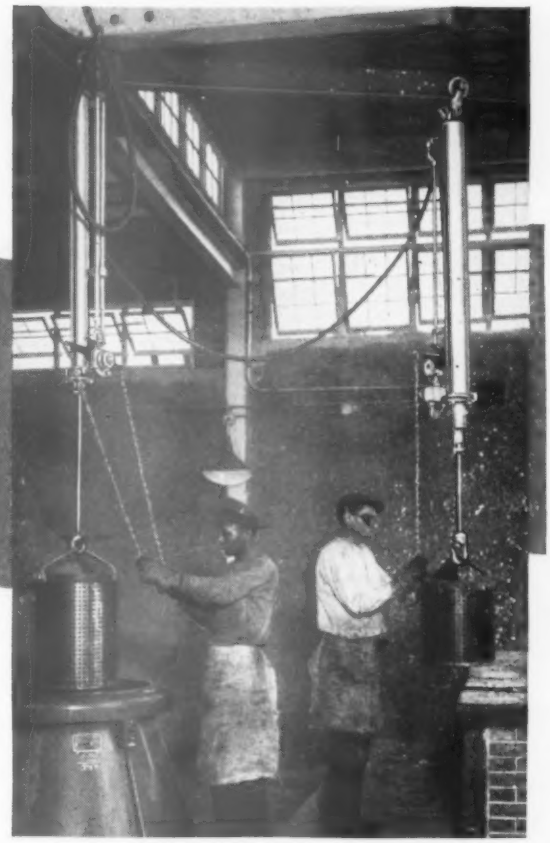
Table of Contents 3

Classified Advertisers, Pages 298, 299, 300, 301, 302, 303.

continued on Page 306

Get More Production Per Man with . . .

CURTIS AIR HOISTS



The speed, ease of handling and accurate control of Curtis air-powered Hoists and Cylinders step up production.

Wherever a lifting, pulling or pushing operation is involved, CURTIS Air Hoists save time and labor; cut load-handling costs.

Curtis Air Hoists provide:

- Low original cost
- One-man operation
- Immunity to abuse by overloading
- Capacities to 10 tons
- Light weight
- Lowest operating expense
- Finger-tip control
- Pendant, bracketed or rope-compounded types

Send for Bulletin C-7 on Curtis Air Hoists, Air Cylinders and Air Compressors.

CURTIS

PNEUMATIC MACHINERY DIVISION

of Curtis Manufacturing Company

1922 Kienlen Avenue - St. Louis 20, Missouri

94 Years of Precision Manufacturing

CURTIS PNEUMATIC MACHINERY DIVISION *of Curtis Manufacturing Company* H-594
1922 Kienlen Avenue, St. Louis 20, Missouri

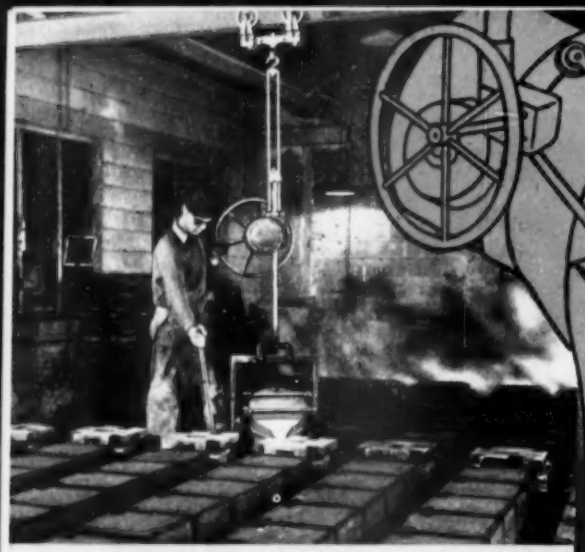
Please send me Form C-7 on Curtis Air Hoists, Air Cylinders and Curtis Air Compressors.

Name.....

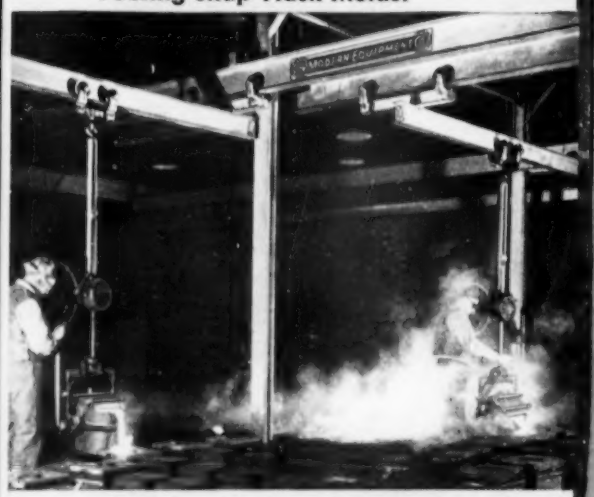
Firm.....

Address.....

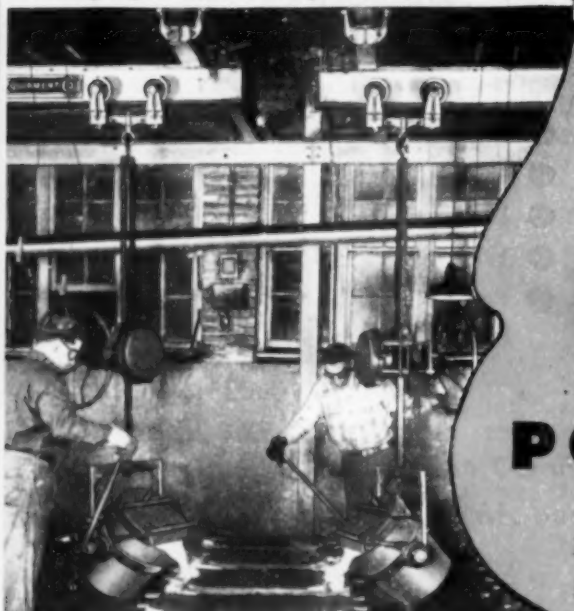
City.....Zone.....State.....



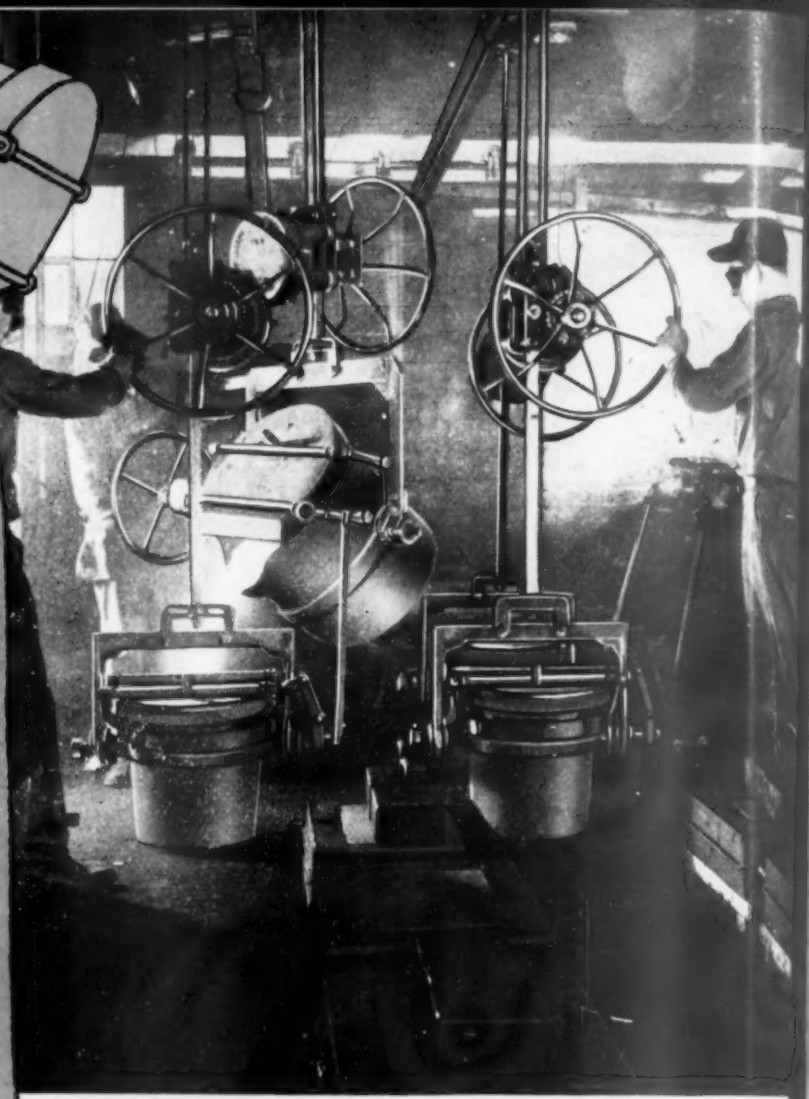
Pouring Snap-Flask Molds.



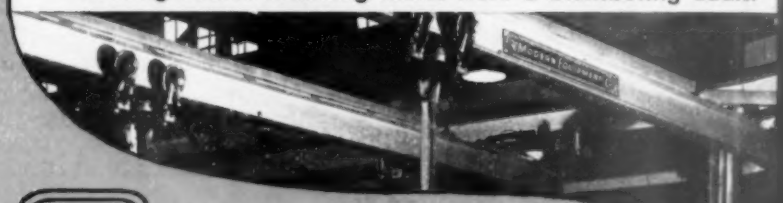
Pouring light work on Squeezer Floors.



Two-Up Pouring from adjacent cranes on individual runways. Easy transfer from crane to crane, via stationary cross-over, provides full floor coverage . . . circumventing such obstacles as building columns.



Pouring Ladles receiving metal from a Distributing Ladle.



MODERN
POURING SYSTEMS

. . . engineered for Full Floor Coverage coupled with High-Efficiency, Low-Cost Pouring . . . are delivering Top Performance in hundreds of top flight foundries. Write for Descriptive Bulletins 142, 143 and 143-B, or ask your MODERN Representative.

MODERN EQUIPMENT CO.

PORT WASHINGTON, WISCONSIN

Cupolas • Cupola Chargers • Covered and Insulated Ladles • Lifetime Geared Ladles • Improved Bottom Pour Ladles • Metal Pouring Systems • Crane and Monorail Systems for Metal and Mold Handling • Furnace Charging Cranes • Electric Cranes

Stevens Liquid Parting

. . . a thin, transparent liquid . . . contains a special blend of waterproofing ingredients combining to form a parting film that will give from 15 to 60 molds for each application. An excellent parting for use on metal match-plates of any metal; on loose patterns and on core boxes.

Quickly and effectively removes dirt and gummy films from metal patterns, plates and core boxes; an excellent rust preventative, and preservative for metal plates and boxes which are to be stored . . . also used on molders' shovels to prevent sand from sticking.

Because it gives so many molds per application it is economical to use; saves time; eliminates dusty air around molders.

Shipped in 1 and 5 gallon cans and 53 gallon drums.

We will gladly send a working sample for you to test under actual working conditions, so sure are we that you will be highly pleased with its working qualities.

. . . and, speaking of Partings . . . t
Stevens Sno-White Non-Silica Partin
for perfect lifts of sand from match plat
or loose pattern and of cope from dra

Of fine texture, it clings well to ve
tical surfaces, making difficult drav
easy. Works perfectly on either h
or cold sand.

Packed in paper lined barrels
450 lbs. net.

Stevens Columbia Parting

. . . a Tripoli base parting,
light creamy color and very fin
It does not pack in the shak
bag, but flows easily. Try
on core boxes for the "toug
est draws".

Insures clean lifts no matt
how complicated the patte
or how difficult the drav
Forms a uniform parting lin

Packed in paper line
barrels — 350 lbs. ne

If the Foundry Facing you are using bears this label → it MUST BE GOOD

FREDERIC B. STEVENS, INC.
FOUNDRY FACING MATERIALS
THIS BARREL CONTAINS STEVENS CORE PASTE
DETROIT, MICH.

FREDERIC B. STEVENS INCORPORATED

DETROIT 16, MICHIGAN

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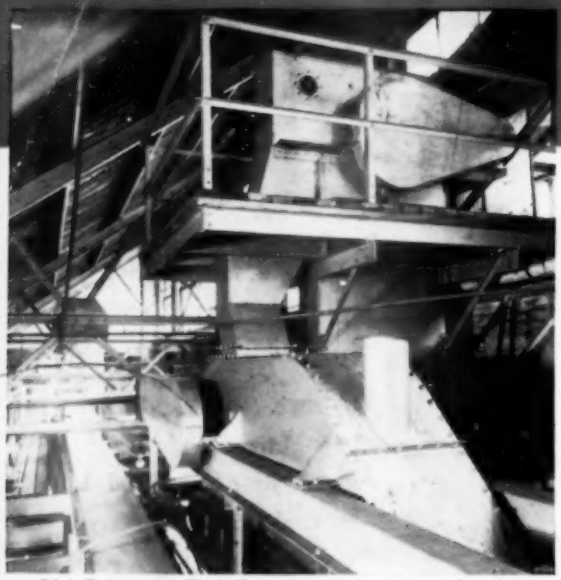
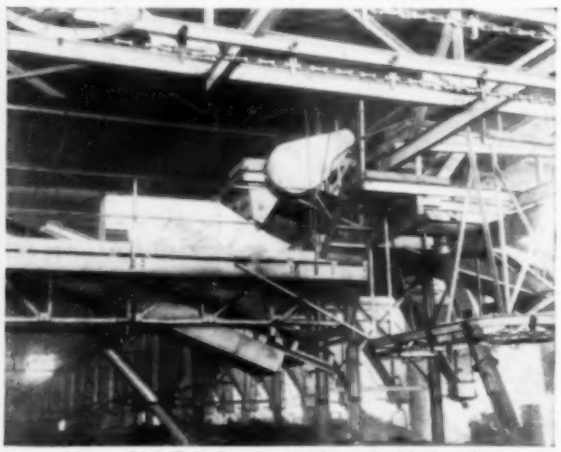
- NEW YORK and PENNSYLVANIA . . 93 Stone St., Buffalo, N. Y.
- INDIANA . . Hoosier Supply Co., 36 Shelby St., Indianapolis, Ind.
- CANADA . . FREDERIC B. STEVENS OF CANADA, LIMITED
- 1262 McDougall St. . . . . Windsor, Ontario
- 41 Dover Court . . . . . Toronto, Ontario

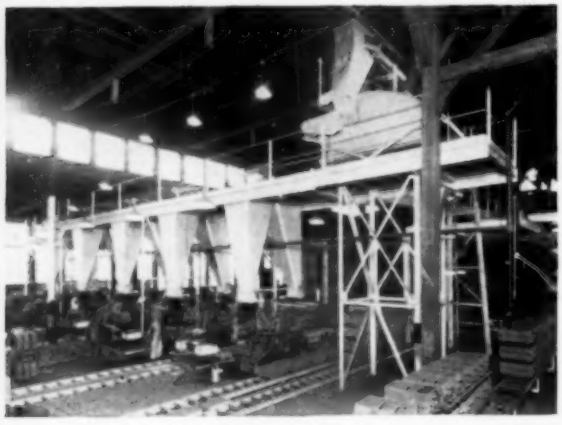
LINK-BELT *SEP*-AERATORS and REVIVIFIERS—*Sand preparation cost cutters*



Link-Belt sand ➤Revivifier➤ installation in large foundry.



Above: Link-Belt Sep-Aerator in malleable foundry.
Below: Link-Belt ➤Revivifier➤ and other equipment in Southern foundry.



11,031

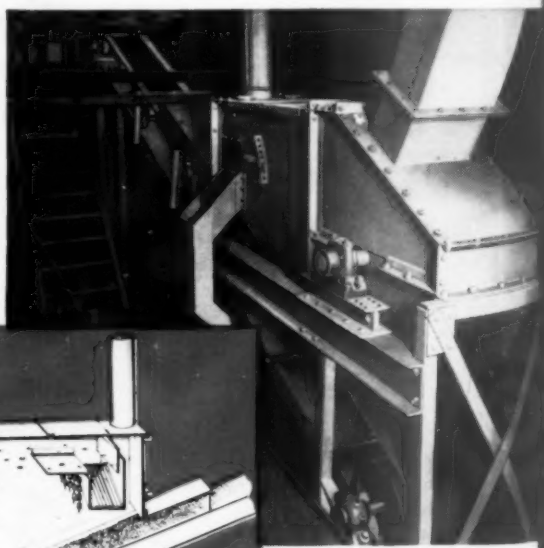
The Link-Belt ➤Revivifier

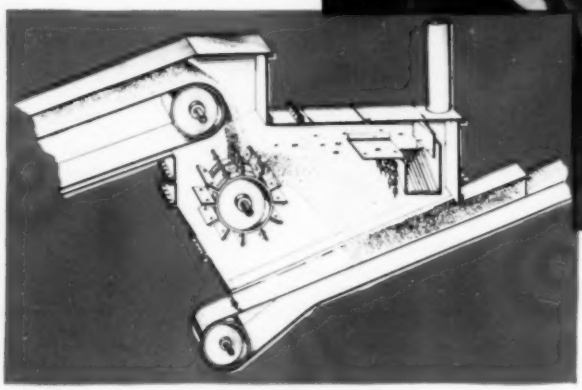
Produce uniform Fluffy sand with the Right "Feel"

THE MODERN, streamlined Link-Belt ➤Revivifier➤ effectively fluffs and cools foundry molding sand—producing a uniform, aerated and flowable sand with the right "feel"—sand that will ram to uniform density in the mold. Made in four sizes for maximum capacities of from 25 to 150 tons an hour.

A supplementary unit, the Link-Belt Sep-Aerator, is particularly adapted to non-ferrous foundries where it is not possible to remove metallic shot by magnetic means. It not only does a thorough aerating and mixing job, but also separates metallic shot, pebbles and small refuse. A high capacity unit, ideally suited for continuous systems.

Let us give you detailed information on the Link-Belt ➤Revivifier➤ and Sep-Aerator.





At left and above are illustrated the Sep-Aerator, showing principle of operation.

LINK-BELT COMPANY Chicago 9, Indianapolis 6, Philadelphia 40, Atlanta, Dallas 1, Minneapolis 5, San Francisco 24, Los Angeles 33, Seattle 4, Toronto 8. Offices in Principal Cities.

THE SYMBOL OF QUALITY LB LINK-BELT

MANUFACTURERS ASSOCIATION, INC. FOUNDRY EQUIPMENT

LINK-BELT CONVEYORS

AND PREPARATION MACHINERY